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Mental Health Service Utilization & Military Retention in OIF National Guard Troops

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14. ABSTRACT This report describes progress towards completing a 4-wave longitudinal cohort study of pre-deployment risk and resilience factors predictive of post-deployment levels of mental health disruptions, mental health service utilization, and military retention and attrition over time. Using standard mail survey methodology, Wave 2 self-report measures have been gathered from 81% of the original Baseline/Wave 1 cohort with response bias appearing minimal. Wave 3 data have been collected from 64% of the Wave 1 cohort. A second pre-deployment cohort has been added to this study, with follow up data collection in progress. Results of preliminary data analyses are discussed.					
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1. INTRODUCTION

Modern military operations have increasingly relied on National Guard and Reserve (NGR) troop deployments in peacekeeping and combat missions. As these conflicts persist, there have been considerable challenges in recruiting and maintaining sufficient numbers of trained military personnel, especially within the National Guard. The goal of this project is to identify psychosocial factors that predict post-deployment levels of mental health disruptions, mental health service utilization, and military retention and attrition over time. By learning about what predicts psychiatric problems and what hampers the use of psychiatric services, we can develop new ways to increase soldiers' resilience and recovery from combat-related distress, and thus, increase military retention.

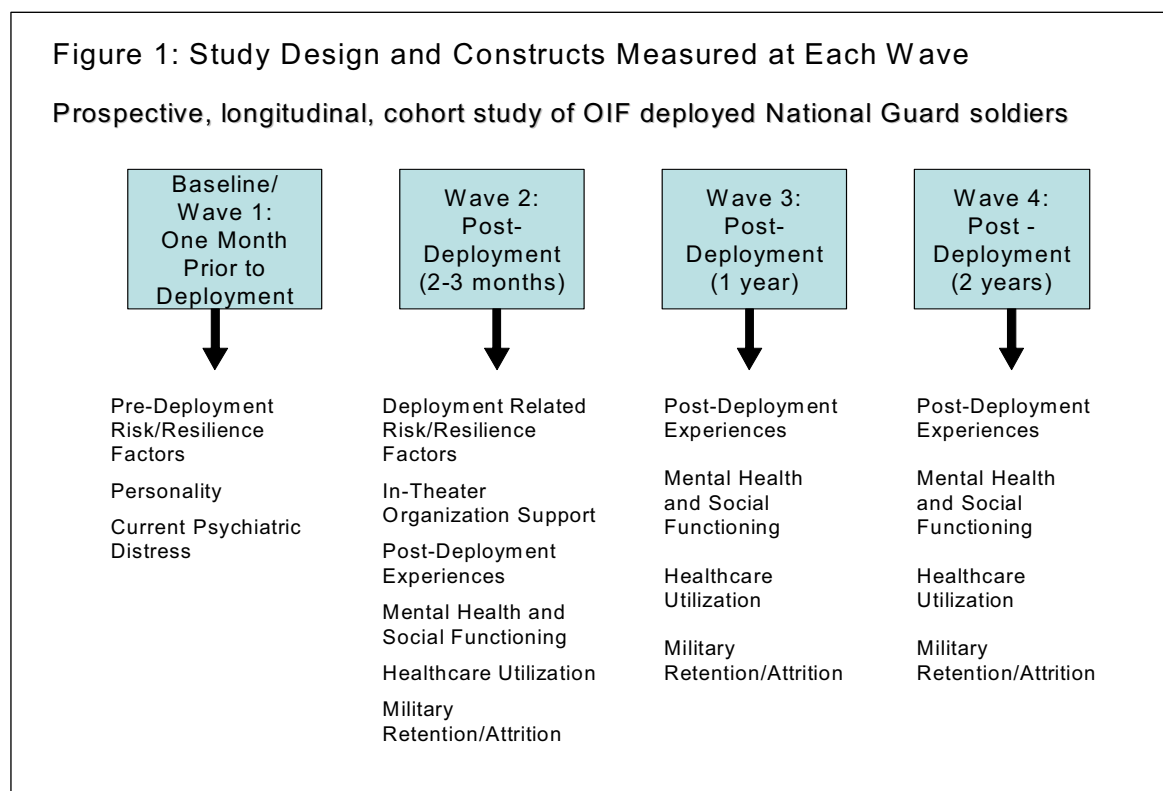
2. PROGRESS REPORT

This is the second annual report for project W81XWH-07-2-0033, covering the period of 15 March 2008 through 14 March 2009. We have successfully completed all tasks outlined in our approved Statement of Work for Year 2 of this project and are progressing successfully without any notable problems. Briefly, we have completed Wave 2 data collection for the initial 1/34 BCT cohort. The data have been merged with our pre-deployment database and preliminary analyses of the temporal relationships between pre-deployment risk and resilience factors and Wave 2 outcomes have been conducted. These initial findings have been shared with NG commanders as well as other DoD leadership and dissemination activities have begun (**Task 7**). Wave 3 data collection has been completed for the 1/34 BCT cohort, data have been scanned, and an SPSS database has been established (**Task 8**). Finally, as part of our revised Statement of Work approved on 10 Oct 2008, we have taken steps to include the 2/147 AHB cohort into our overall sample. All relevant IRB approvals were obtained and a Subject Tracking Database was established. Important start-up activities were completed and data has been collected from approximately 50% of the original cohort (**Task 9**). The report that follows provides a complete summary of our research accomplishments to date relevant to Year 2 of our approved Statement of Work.

2.1. Overview of the Project

The overall goal of this project is to conduct a 4-wave longitudinal cohort study (see Figure 1 below for illustration of the study design and summary of constructs to be measured at each wave) to identify psychosocial factors that predict post-deployment levels of mental health disruptions, mental health service utilization, and military retention and attrition. Participants from two pre-deployment cohorts of National Guard soldiers (1/34 BCT deployed to Iraq from March 2006 – July/August 2007; 2/147 AHB deployed to Iraq from July 2007 – July 2008) are included in this longitudinal study. Much of our work in the second year of the project (period of 15 March 2008 through 14 March 2009) has focused on completing Wave 2 and Wave 3 data collection, scanning

and verifying data and merging with pre-deployment data, conducting preliminary longitudinal analyses, and beginning dissemination activities.



2.2. Final Wave 2 Summary: 1/34 BCT Cohort

2.2.1. *Wave 2 Data Collection.* For the 1/34 BCT cohort, Wave 2 data was collect from 424 participants (final response rate = 81%). As illustrated in Table 1, survey methods were successful in maximizing our response rate.

Table 1. *Response Rate for 1/34 BCT Cohort after each Wave 2 Mailing Point*

Response Rates (<i>n</i> = 398)	N	%	Cumulative %
Following 1 st Survey	162	31%	31%
Following Postcard	96	18%	49%
Following 2 nd Survey	49	9%	59%
Following Fed-Ex Mailing	68	13%	72%
Following New Year Mailing	49	9%	81%
Total	424		81%

Less than 3% of the initial Baseline/Wave 1 cohort ($n = 14$) have withdrawn from the study. These 14 participants indicated their refusal to participate by sending back a blank survey or calling the project coordinator to opt out of the project.

2.2.2. *Analyses of Response Bias.* To test for response bias, we compared responders and non-responders to the Wave 2 survey on a number of pre-deployment variables collected at Baseline/Wave 1 (see Table 2 below). Importantly, there was no significant difference between responders and non-responders on gender, ethnicity (white vs. non-white/multiracial), pre-deployment psychiatric symptoms (PCL total score or BDI-II total score), stressors experienced prior to deployment, or perceived unit social support prior to deployment. There were minimal differences between responders and non-responders on rank (enlisted vs. officer/warrant officer), marital status, and age. Non-responders were more likely to be enlisted $\chi^2(1, N = 522) = 4.43, p = .035$, not married $\chi^2(1, N = 522) = 10.65, p = .001$, and slightly younger than responders, $F(520) = 19.88, p < .001$.

Table 2. Wave 2 Demographics of the 1/34 BCT Total Sample, Respondents, and Non-Respondents

	Total Sample ($n = 522$)	Respondents ($n = 424$)	Non-respondents ($n = 98$)
Age (years)	29.1 (8.6)	29.9 (8.8)	25.6 (6.9)
Prior Stressors	5.6 (3.2)	5.6 (3.3)	5.5 (3.1)
PTSD Symptoms (PCL)	26.2 (10.0)	26.0 (9.8)	26.9 (11.1)
Depressive Symptoms (BDI-II)	6.0 (6.8)	6.1 (6.8)	5.8 (7.0)
Unit Social Support	40.6 (9.9)	40.5 (10.0)	41.3(9.4)
Gender (% male)	89%	88%	92%
Marital Status (% married)	45%	49%	31%
Ethnicity (% Caucasian)	93%	94%	89%
Rank (% enlisted)	90%	89%	96%

Note: PCL = PTSD Checklist; BDI-II = Beck Depression Inventory-II

These findings are not surprising given our experience in tracking participants. Anecdotally, younger participants appear more mobile and likely to list their parents' address as their home address while they live at a temporary address, such as a

college dorm or apartment with roommates. In this case, mailed surveys, while sent to an address provided, may not have reached the intended participant in a timely manner. However, these differences are minor overall and suggest minimal response bias.

2.3. Collection of Wave 3 Data: 1/34 BCT Cohort

2.3.1. Wave 3 Response Rate. To date, 327 participants from the initial 1/34 BCT cohort have returned Wave 3 surveys (response rate = 64% of 508 still consented participants). Table 3 shows that our use of routine survey methods continued to achieve a good response rate; however, subject tracking efforts (sending a New Years card) had little impact on additional response. Currently, we are verifying contact information with participants, and anticipate our final response rate may rise with this personal contact.

Table 3. 1/34 BCT Response Rate after each Wave 3 Mailing Point

Response Rates (n = 327)	N	%	Cumulative %
Following 1 st Survey	131	26%	26%
Following Postcard	76	15%	41%
Following 2 nd Survey	48	9%	50%
Following Fed-Ex Mailing	69	14%	64%
Following New Year Mailing	3	<1%	64%
Total	327		64%

At the completion of Wave 3 data collection, less than 4% of the total initial Baseline/Wave 1 cohort (n = 8 after start of Wave 3, n = 22 total) have withdrawn from the study. Sixteen Wave 2 non-responders have participated at Wave 3; modern missing data techniques will be used to include these subjects without Wave 2 data in the final analyses.

2.3.2. Analyses of Response Bias. To test for response bias at Wave 3, we compared Wave 3 responders and non-responders on a number of pre-deployment variables collected at Baseline/Wave 1 (see Table 4 below). Similar to results at Wave 2, there was no significant difference between responders and non-responders on gender, ethnicity, psychiatric symptoms (PCL total score; BDI-II total score), stressors experienced prior to deployment, and perceived unit social support prior to deployment. Again, non-responders at Wave 3 were slightly younger than responders, $F(506) = 21.36$, $p = <.001$. Single participants were less likely to return surveys than married participants, $\chi^2(1, N = 508) = 19.37$, $p < .001$. Enlisted personnel were less likely to return surveys than officers and warrant officers, $\chi^2(1, N = 508) = 9.32$, $p = .002$.

Table 4. Wave 3 Demographics of 1/34 BCT Total Sample, Respondents, and Non-Respondents

	Total Sample (<i>n</i> = 508)	Respondents (<i>n</i> = 327)	Non-respondents (<i>n</i> = 181)
Age (years)	29.2 (8.7)	30.5 (8.8)	26.8 (8.0)
Prior Stressors	5.6 (3.2)	5.6 (3.2)	5.6 (3.3)
PTSD Symptoms (PCL)	26.1 (10.0)	25.6 (9.7)	27.0 (10.4)
Depressive Symptoms (BDI-II)	6.0 (6.8)	5.8 (6.7)	6.4 (7.0)
Unit Social Support	40.7 (9.9)	40.3 (10.0)	41.3 (9.8)
Gender (% male)	89%	89%	88%
Marital Status (% married)	46%	53%	33%
Ethnicity (% Caucasian)	93%	94%	90%
Rank (% enlisted)	90%	87%	96%

Note: PCL = PTSD Checklist; BDI-II = Beck Depression Inventory-II

2.4. Summary of 2/147 AHB Cohort

2.4.1. *Inclusion of Additional Cohort.* To increase the overall N of this longitudinal study, we followed up a second cohort of 207 National Guard soldiers deployed to Iraq with the 2nd Battalion, 147th Assault Helicopter Battalion (2/147 AHB) who had provided our team with pre-deployment data and follow up contact information. The 2/147 AHB returned from OIF deployment in July of 2008. Using supplemental funds from VA Health Services Research & Development, we collected Wave 2 post-deployment data from this cohort. The revised SOW approved by the Army Contracting Office includes this cohort into the current longitudinal study. Thus, Wave 2 data collection started in Year 2 is described below. Wave 3 and 4 data collection with this cohort are planned.

2.4.2. *2/147 AHB Wave 2 Data Collection.* The methods used to collect data from the original cohort were implemented to collect data from the 2/147 AHB cohort. Our close collaboration with the MN NG allowed our research team to be apprised of deployment schedules and allowed us to complete start-up tasks in a timely manner.

These start-up tasks included updating our IRB protocols, establishing a systematic tracking tool, and preparing survey materials. We continued followed the same mailed survey procedures using a modified Dillman protocol (Dillman, 2007). The only exception to the mailing protocol was utilizing United States Postal Service Priority Mail instead of Federal Express at the third survey mailing point.

2.4.3. 2/147 AHB Cohort Wave 2 Response Rate. To date, 101 participants from the 2/147 AHB cohort have participated in Wave 2 (response rate = 49%). Table 5 shows the cumulative response rate for this cohort using standard survey methods.

Table 5. *2/147 AHB Cohort Response Rate after each Wave 2 Mailing Point*

Response Rates (<i>n</i> = 101)	N	%	Cumulative %
Following 1 st Survey	32	15%	15%
Following Postcard	26	13%	28%
Following 2 nd Survey	20	10%	38%
Following Priority Mailing	12	6%	43%
Following New Year Mailing	10	5%	49%
Total	101		49%

At the completion of Wave 2 data collection, 1% of the total initial Baseline/Wave 1 cohort (*n* = 3) have withdrawn from study by returning a blank survey or asking to be removed from our mailing list.

2.4.4. Analyses of Response Bias. To test for response bias, we compared responders and non-responders to the Wave 2 survey on a number of pre-deployment variables collected at Baseline/Wave 1 (see Table 6 below). There was no significant difference between responders and non-responders on gender, ethnicity, pre-deployment psychiatric symptoms (PCL total score; BDI-II total score), stressors experienced prior to deployment, and perceived unit social support prior to deployment. Non-responders at Wave 2 were younger, and single participants were less likely to return surveys than married participants, $\chi^2 (1, N = 207) = 4.25, p < .05$, as were enlisted participants versus officers/warrant officers, $\chi^2 (1, N = 207) = 6.86, p < .01$

Table 6. Wave 2 Demographics of 2/147 AHB Cohort Total Sample, Respondents, and Non-respondents

	Total Sample (<i>n</i> = 207)	Respondents (<i>n</i> = 101)	Non-respondents (<i>n</i> = 106)
Age (years)	32.3 (9.5)	35.6 (9.4)	29.3 (8.6)
Prior Stressors	5.4 (3.2)	5.6 (3.1)	5.2 (3.4)
PTSD Symptoms (PCL)	25.5 (10.0)	26.1 (10.7)	24.8 (9.3)
Depressive Symptoms (BDI-II)	5.5 (6.2)	5.5 (6.4)	5.6 (6.1)
Unit Social Support	41.7 (9.5)	42.3 (9.7)	41.2 (9.3)
Gender (% male)	84%	84%	83%
Marital Status (% married)	55%	62%	48%
Ethnicity (% Caucasian)	74%	75%	73%
Rank (% enlisted)	75%	67%	83%

Note: PCL = PTSD Checklist; BDI-II = Beck Depression Inventory-II

The response bias findings at Wave 2 for the 2/147 AHB cohort are similar to the findings Wave 3 for the original cohort. Younger participants are harder to track than older participants with established residences. Older participants are also more likely to be married and have the rank of officer or warrant officer. Therefore, it is not surprising that respondents and non-respondents significantly vary on these three variables.

2.5. Preliminary Findings

2.5.1. Pre-deployment Phase: Baseline Sample Characteristics. Preliminary analyses of Baseline/Wave 1 sample characteristics have focused on describing psychiatric symptom reports and comparisons between those previously deployed to OIF and those not previously deployed (Polusny et al., 2009); pre-deployment alcohol use and its associations with demographic variables, personality, and PTSD symptoms (Ferrier-Auerbach, Kehle, Erbes, Arbisi, Thuras, & Polusny, in press), and gender differences in pre-deployment risk and resilience factors (Carter-Visscher, Polusny, Murdoch, Thuras, Erbes, & Kehle, under revision). Overall, low rates of psychiatric symptoms were reported by troops pre-deployment (Wave 1). At Baseline/Wave 1, 4% screened positive for probable PTSD using Hoge and colleagues strict criteria defined as meeting DSM-IV criteria on the PCL (reporting at least 1 intrusion symptom, 3

avoidance symptoms, and 2 hyperarousal symptoms at the moderate level) and total score of at least 50 (Hoge, Castro, Messer, McGurk, Cotting, & Koffman, 2004). At Baseline/Wave 1, 6% of participants screened positive for probable depression using a cut score of 20 or more on the BDI-II indicating moderate depression. Soldiers previously deployed to OEF/OIF reported higher PTSD ($p < .01$), depressive ($p = .01$), and somatic symptoms ($p = .05$) when compared to soldiers preparing for their first deployment to Iraq. Pre-deployment perceptions of unit support, perceptions of military preparedness, and worries about how deployment will impact life and family were all associated with greater mental health concerns before deployment (Polusny et al., 2009). With regards to alcohol use, about 27% of National Guard soldiers reported binge drinking at least once per week in the year prior to deployment. Pre-deployment alcohol use was associated with younger age, fewer years of education, being unmarried, personality, and PTSD symptoms (Ferrier-Auerbach et al., in press).

Pre-deployment gender differences findings were mixed (Carter-Visscher et al., under revision). There were no significant pre-deployment gender differences in PTSD symptoms; however, female soldiers reported higher depressive symptoms ($p < .05$) and somatic complaints ($p < .05$) than males. Gender differences were observed in pre-deployment reports of prior stressor exposure. For example, 51% of women compared to 7% of men reported a prior sexual assault. 63% of men reported a physical assault, whereas 43% of women reported a physical assault. In terms of other pre-deployment risk/resilience factors, female soldiers reported feeling significantly less well-prepared for deployment ($p < .05$) and perceived poorer unit social support ($p < .05$) than males. Gender did not significantly alter the magnitude of the association between risk/resilience factors and mental health symptoms.

2.5.2 *Deployment Experiences.* Participants reported a mean length of OIF deployment of 16 (SD = 2) months. During deployment, participants reported considerable combat exposure. For example, 93% reported receiving hostile incoming enemy fire, 91% reported going on combat patrols or missions, and 57% were in a unit engaged in a battle in which it suffered casualties, 56% were in a vehicle that was under fire, and 54% reported encountering land or water mines and/or booby traps. Many soldiers reported observing homes or villages that had been destroyed (67%), witnessing American/allies after they had been severely wounded or disfigured in combat (58%), witnessing the bodies of dead civilians (52%), and taking care of injured or dying people (46%). Overall, 12% reported being wounded or injured in combat, 21% reported concussion or mild Traumatic Brain Injury (mTBI defined as any injury in theater involving loss or altered consciousness), and 93% reported being exposed to or witnessing an explosion (such as an IED, RPG, landmine, grenade, mortar rounds, or rocket attack). Of those who reported being exposed or witnessing an explosion, 68% reported being close enough to the blast to feel the wave and 38% reported post-blast problems such as difficulties with attention or memory and/or trouble hearing.

2.5.3. *Post-deployment Outcomes.* Preliminary analyses have been conducted on two main areas of post-deployment outcomes: PTSD symptoms (Polusny, Erbes, Arbisi, Thuras, Reddy, & Murdoch, in preparation) and health care utilization (Kehle et

al., under revision). At Wave 2, 16% of participants screened positive for probable PTSD using Hoge and colleagues strict criteria (Hoge et al., 2004). Although there were no gender differences in baseline levels of PTSD, women reported significantly higher rates of probable PTSD (22%) than men (14%) at Wave 2 ($p < .01$). Hierarchical linear regression analyses adjusted for gender, age, and baseline PTSD symptoms, revealed pre-deployment (neuroticism, prior life stressor exposure, perceptions of preparedness for deployment, and worries about the impact of deployment on life and family [$p < .0001$, $R^2 = .26$]), deployment related (combat exposure, witnessing the aftermath of battle, and greater perceived life threat [$p < .0001$, R^2 change = .12]), and post-deployment variables (lack of post-deployment social support [$p < .0001$, R^2 change = .11]) were associated with Wave 2 PTSD symptomatology. When the full model predicting Wave 2 PCL was examined, female gender, baseline PTSD symptoms, the personality dimension of neuroticism, combat exposure, witnessing the aftermath of battle, greater perceived life threat, and lack of post-deployment social support were significant unique predictors, accounting for 48% of the variance in the final full model.

To date, no study has examined predictors of mental health treatment seeking among NG component troops. We examined participants' reports of mental health treatment seeking and factors that predict the early use of mental health treatment by National Guard soldiers following OIF deployment (Kehle et al., under revision). Approximately one third (35%) of the sample had received mental health services since returning from Iraq. Nearly one quarter (23%) of respondents said they had received psychotherapy only; 4%, psychiatric medications only; and 7%, both psychotherapy and psychiatric medications. Soldiers who screened positive for PTSD were significantly more likely to say they were receiving psychotherapy (44% vs. 27%; $\chi^2 (1, N = 409) = 7.49, p = .006$) or medications (30% vs. 8%; $\chi^2 (1, N = 410) = 26.32, p < .001$) than soldiers who did not screen positive for PTSD. Soldiers who screened positive for depression were also more likely to say they were receiving psychotherapy (50% vs. 28%; $\chi^2 (1, N = 409) = 9.84, p = .002$) or medications (36% vs. 9%; $\chi^2 (1, N = 410) = 31.30, p < .001$) than those who did not screen positive for depression. Significant predictors of psychotherapy included being injured in-theater, in-theater use of mental health services, need (which was characterized by symptoms of depression and PTSD), and positive beliefs about mental health treatment. While stigma was reported by participants, it was not a significant predictor of mental health treatment seeking. Significant predictors of self-reported psychiatric medication use following deployment included in-theater injury, need, and greater stigma (i.e., "mental health treatment doesn't work").

2.5.4. *Other Findings.* We have also examined a number of questions less central to the study's main hypotheses. For example, we examined the association between post-deployment PTSD symptoms and couple functioning. Soldiers with PTSD symptoms reported poorer couple functioning, and the link between specific PTSD symptom clusters was examined (Erbes, Meis, Polusny, & Compton, under revision). With regards to methodology issues, we examined the influence of randomly counterbalancing survey format on participants' symptom reporting. The order in which surveys were formatted did not influence symptom reports (Reddy, Polusny, & Murdoch, under review). Additionally, data from this project contributed to the development and

initial validation of the Response to Stressful Experiences Scale (RSES) - a multidimensional index that measures a broad array of processes and dispositional tendencies that characterize how individuals respond to stress, adversity, and trauma. We are currently preparing a manuscript with our colleagues from the National Center for PTSD that will report on the initial psychometric properties of the RSES within military personnel (Johnson et al., in preparation).

3. KEY RESEARCH ACCOMPLISHMENTS

- Characterized levels of psychiatric distress, alcohol use and pre-deployment risk and resilience profiles among National Guard troops preparing to deploy to OIF
- Identified correlates of pre-deployment PTSD, depression, somatic symptoms and alcohol abuse
- Identified gender differences in pre-deployment mental health functioning and risk and resilience profiles among National Guard soldiers
- Identified pre-deployment, deployment-related, and post-deployment predictors of post-deployment PTSD symptoms
- Characterized National Guard soldiers use of mental health treatment following deployment and identified factors predictive of early mental health treatment seeking
- Characterized the impact of post-deployment PTSD symptoms on soldiers' couple relationship functioning
- Contributed to validation of the National Center for PTSD Reactions to Stressful Events Scale (RSES) - new measure of psychological resilience for use with military populations

4. REPORTABLE OUTCOMES

The following is a comprehensive list of published, submitted and in progress manuscripts, abstracts, and presentations that have resulted from the current project in Year 2.

4.1. Peer Reviewed Publications

Polusny, M. A., Erbes, C. R., Arbisi, P. A., Thuras, P., Kehle, S., Rath, M., Courage, C., Reddy, M. K. & Duffy, C. (2009). Impact of prior OEF/OIF combat duty on mental health in a pre-deployment cohort of National Guard Soldiers. *Military Medicine*, 174, 1-6.

Ferrier-Auerbach, A.G., Kehle, S. M., Erbes, C. R., Arbisi, P. A., Thuras, P., & Polusny, M. A. (in press). Pre-deployment predictors of alcohol use in National Guard soldiers. *Addictive Behaviors*.

Erbes, C. R., Polusny, M. A., MacDermid, S., & Compton, J. S. (2008). Couple therapy with combat veterans and their partners. *Journal of Clinical Psychology: In Session*, 64 (8), 972-983.

4.2. Manuscript submitted (in review or revision):

Carter-Visscher, R., Polusny, M. A., Murdoch, M., Thuras, P., Erbes, C. R. & Kehle, S. M. (2009). *Gender differences in predeployment stressors and mental health among National Guard troops deploying to Operation Iraqi Freedom (OIF)*. Manuscript submitted for publication (under revision).

Erbes, C. R., Meis, L., Polusny, M. A., & Compton, J. S. (2009). *Couple functioning and PTSD symptoms in National Guard Veterans of the Iraq War*. Manuscript submitted for publication (under revision).

Kehle, S. M., Polusny, M. A., Murdoch, M., Erbes, C. R., Arbisi, P. A., Thuras, P., & Meis, L. (2009). *Early mental health treatment seeking among Iraq War National Guard soldiers*. Manuscript submitted for publication (under revision).

Reddy, M. K., Polusny, M. A., & Murdoch, M. M. (2009). *Does counterbalancing affect symptom-reporting in trauma surveys?* Manuscript submitted for publication (under review).

4.3. Manuscripts in Preparation:

Polusny, M. A., Erbes, C. R., Arbisi, P. A., Thuras, P., Reddy, M. K., & Murdoch, M. (2009). *Prospective risk and resilience factors associated with PTSD symptoms in National Guard Soldiers deployed to Iraq*. Manuscript in preparation.

Johnson, D. C., Polusny, M. A., Erbes, C. R., King, D., King, L., Litz, B., Schnurr, P., Friedman, M., & Southwick, S. (2009). *The Response to Stressful Experiences Scale (RSES)*. VA National Center for PTSD. Manuscript in preparation.

4.4. Paper Presentations

Dr. Polusny and colleagues presented initial prospective findings from this study at a symposium held at the annual meeting of the American Psychological Association in August 2008. Additionally, findings were presented at the annual meetings of the International Society for Traumatic Stress Studies, Association for Behavioral and Cognitive Therapies, VA Health Services Research and Development, and Annual Marine Corps Combat and Operational Stress Control (MCCOSC) Conference. An abstract reporting on initial prospective findings from this study has been submitted for presentation at the 2009 Military Health Research Forum.

- Polusny, M. A., Erbes, C. R., Arbisi, P. A., Thuras, P., Reddy, M. K., Erickson, D., Murdoch, M., Rath, M., & Courage, C. (2008, August). The Readiness and Resilience in National Guard Soldier Cohort Study. In M. A. Polusny, & P. A. Arbisi (Chairs), *Prospective predictors of resilience in OIF deployed National Guard Soldiers*. Symposium presented at the annual meeting of the American Psychological Association, Boston, MA.
- Erbes, C. R., Polusny, M. A., Arbisi, P. A., Thuras, P., Reddy, M. K., Rath, M., & Courage, C. (2008, August). Prospective risk/resilience factors predicting in-theater and post-deployment PTSD symptoms. In M. A. Polusny, & P. A. Arbisi (Chairs), *Prospective predictors of resilience in OIF deployed National Guard Soldiers*. Symposium presented at the annual meeting of the American Psychological Association, Boston, MA.
- Arbisi, P. A., Thuras, P., Reddy, M. K., Erbes, C. R., & Polusny, M. A. (2008, August). Neuroticism and introversion moderate distress in deployed National Guard Soldiers. In M. A. Polusny, & P. A. Arbisi (Chairs), *Prospective predictors of resilience in OIF deployed National Guard Soldiers*. Symposium presented at the annual meeting of the American Psychological Association, Boston, MA.
- Ferrier-Auerbach, A. G., Kehle, S. M., Erbes, C. R., Arbisi, P. A., Thuras, P., & Polusny, M. A. (2008, August). Alcohol use in National Guard Soldiers pre- and post-deployment. In M. A. Polusny, & P. A. Arbisi (Chairs), *Prospective predictors of resilience in OIF deployed National Guard Soldiers*. Symposium presented at the annual meeting of the American Psychological Association, Boston, MA.
- Johnson, D. C., Polusny, M. A., Erbes, C. R., King, D., King, L., Litz, B. T., Schnurr, P., Friedman, M. & Southwick, S. M. (2008, August). *Resilience and Response to Stress: Development and Initial Validation of the Response to Stressful Experiences Scale (RSES)*. Paper presented at the 2nd Annual Marine Corps Combat and Operational Stress Control (MCCOSC) Conference, San Diego, CA.
- Polusny, M.A., Erbes, C. R., Arbisi, P. A., Thuras, P., Reddy, M. K., Kehle, S. M., Erickson, D., Murdoch, M., Rath, M., & Courage, C. (2008, November). *Mental health risk and resilience in OIF Deployment National Guard Soldiers: Prospective predictors*. Paper presented at the annual meeting of the International Society for Traumatic Stress Studies, Chicago, IL.
- Meis, L. A., Erbes, C. R., & Polusny, M. A. (2009, February). *Dyadic adjustment and PTSD symptoms among OIF veterans: Symptom clusters and pre to post-deployment functioning*. Paper presented at the 27th VA Health Services Research and Development National Meeting, Baltimore, MD.

4.5. Poster Presentations

Reddy, M. K., Polusny, M. A., Erbes, C. R., Arbisi, P. A., & Murdoch, M. (2008, June). *Recruitment and retention of OIF Veterans in longitudinal research*. Poster presented at the Annual VA Research Day, Minneapolis Veterans Affairs Medical Center, Minneapolis, MN.

Kehle, S. M., Polusny, M. A., Erbes, C., Arbisi, P. A., Thuras, P., Reddy, M. K., Murdoch, M. (2008, November). *Determinants of early mental health treatment seeking among a cohort of Iraq War National Guard Soldiers*. Poster presented at the annual meeting of the Association for Behavioral and Cognitive Therapies, Orlando, FL.

Kehle, S. M., Polusny, M. A., Erbes, C., Arbisi, P. A., Thuras, P., Reddy, M. K., & Murdoch, M. (2009, February). *Rates and predictors of mental health treatment seeking among Iraq War National Guard Soldiers*. Poster presented at the 27th VA Health Services Research and Development National Meeting, Baltimore, MD.

4.6. Invited Presentations/Workshops:

Polusny, M.A. & Erbes, C. R. (2008, April). *Prospective study of combat trauma and resilience in OIF Veterans*. Invited presentation at the Returning Troops Panel, VA Psychology Leadership Conference (Co-Sponsored by the APA Practice Directorate, the Association of VA Psychologist Leaders, and APA Division 18-Psychologists in Public Service), Dallas, TX.

Polusny, M.A. (2008, April). *The RINGS Study: Risk and Resilience in MN NG soldiers*. Invited presentation at the 4th Annual VA VISN 23 Mental Health Research Conference, Minneapolis, MN.

Polusny, M.A., Erbes, C. R., & Arbisi, P. A. (2008, June). *Risk and resilience in returning OIF service personnel*. Invited presentation at the 21th Annual VA Research Day, Minneapolis Veterans Affairs Medical Center, Minneapolis, MN.

Polusny, M.A., Erbes, C. R., & Arbisi, P. A. (2008, October). *Update on the Readiness and Resilience in National Guard Soldiers (RINGS) Project*. Psychiatry Grand Rounds presented at the Minneapolis VA Medical Center.

4.7. Abstracts submitted

Polusny, M. A., Erbes, C., Arbisi, P. A., Thuras, P., Reddy, M. K., Murdoch, M. & Erickson, D. (2009, August). *Prospective risk and resilience factors associated with PTSD symptoms in National Guard Soldiers deployed to Iraq*. Paper submitted to the Military Health Research Forum, Kansas City, MO.

Meis, L. A., Erbes, C. R., Polusny, M. A., & Compton, J. S. (2009, November). Couple functioning and PTSD symptom clusters in National Guard Veterans of the Iraq War. In L. A. Meis (Chair), *Intimate relationships and understanding responses to trauma*. Symposium submitted to the annual meeting of the International Society of Traumatic Stress Studies, Atlanta, GA.

Ferrier-Auerbach, A. G., Kehle, S. M., Erbes, C. R., Arbisi, P. A., & Polusny, M. A. (2009, November). Factors predicting change in alcohol use in military personnel from pre- to post-deployment. In S. M. Kehle (Chair), *Functioning and mental health disruptions among Iraq War National Guard Soldiers*. Symposium submitted to the annual meeting of the Association for Behavioral and Cognitive Therapies, New York, NY.

4.8 Briefings

Briefing on Minneapolis VAMC PTSD treatment services and RINGS Research Program, Brigadier General Gary H. Cheek, Director of Warrior Care and Transition Office, Department of Defense, November 25, 2008.

Briefing on RINGS Study: Preliminary Findings and Implications for National Guard/VA, Colonel Kevin Gerdes, Minnesota National Guard, February 24, 2009.

4.9 Grants Submitted

Polusny, M.A. (PI), Erickson, D., Arbisi, P., & Erbes, C. *Developing Algorithms to Predict Risky PTSD Trajectories in OEF/OIF Veterans*, National Institute of Mental Health (1R21MH086321-01).

In response to RFA-MH-09-060, *Networks(s) for Developing PTSD Risk Assessment Tools (R21)*, Dr. Polusny and colleagues submitted a proposal to conduct secondary analyses of longitudinal data from this project to examine trajectories of PTSD symptoms among National Guard soldiers. The goal of this study was to develop an algorithm that differentially weights a number of background variables that predict risky PTSD trajectories. Although not funded by NIMH, this proposal is currently under review by VA Clinical Science Research & Development.

5. CONCLUSION

This report describes progress in the second year of a 4-wave longitudinal cohort study of pre-deployment risk and resilience factors predictive of post-deployment levels of mental health disruptions, mental health service utilization, and military retention and attrition over time. In the second year, we have accomplished the important work of completing Wave 2 and Wave 3 data collection from the original cohort, conducting

preliminary analyses of the longitudinal data, beginning dissemination activities, and adding additional subjects from a second cohort to increase our overall N to guard against the attrition inherent to longitudinal cohort studies.

For the period of 15 March 2008 to 14 March 2009, we have met all tasks outlined in the approved Statement of Work. The project is progressing on schedule, and no notable problems have been identified. Project tasks for Year 2 were completed in a timely manner. Wave 2 self-report measures were successfully collected from 81% of the Baseline/Wave 1 cohort; 64% of participants have completed Wave 3 self-report measures. While our response rate has decreased from Wave 2 to Wave 3, this is consistent with the natural attrition that occurs in longitudinal studies. We have taken steps to bulk up our sample size for future analyses by adding the 2/147 AHB cohort to our sample. We have successfully collected Wave 2 data from 101 participants from this cohort. Preliminary analyses have been conducted, and the results have been outlined in the report. Dissemination of these results is on-going, with two papers accepted for publication or in press, 3 papers submitted and currently under revision, and 1 additional paper under review. Briefings with the members of National Guard and DoD have also occurred. Our research team is fully prepared and ready to accomplish the tasks outlined for Year 3 of this project.

6. REFERENCES

- Carter-Visscher, R., Polusny, M. A., Murdoch, M., Thuras, P., Erbes, C. R. & Kehle, S. M. (2009). *Gender differences in predeployment stressors and mental health among National Guard troops deploying to Operation Iraqi Freedom (OIF)*. Manuscript submitted for publication.
- Dillman, D. A. (2007). *Mail and telephone surveys: The tailored design method*. Hoboken, NJ: John Wiley & Sons, Inc.
- Erbes, C. R., Meis, L., Polusny, M. A., & Compton, J. S. (2009). *Couple functioning and PTSD symptoms in National Guard Veterans of the Iraq War*. Manuscript submitted for publication (under revision).
- Ferrier-Auerbach, A.G., Kehle, S. M., Erbes, C. R., Arbisi, P. A., Thuras, P., & Polusny, M. A. (in press). Pre-deployment predictors of alcohol use in National Guard Soldiers. *Addictive Behaviors*.
- Hoge, C. W., Castro, C. W., Messer, S. C., McGurk, D., Cotting, D. I., & Koffman, R. L. (2004). Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care. *New England Journal of Medicine*, 351, 75-77.
- Johnson, D. C., Polusny, M. A., Erbes, C. R., King, D., King, L., Litz, B., et al. (2009). *The Response to Stressful Experiences Scale (RSES)*. VA National Center for PTSD. Manuscript in preparation.
- Kehle, S. M., Polusny, M. A., Murdoch, M., Erbes, C. R., Arbisi, P. A., Thuras, P., & Meis, L. (2009). *Early mental health treatment seeking among Iraq War National Guard soldiers*. Manuscript submitted for publication (under revision).
- Polusny, M. A., Erbes, C. R., Arbisi, P. A., Thuras, P., Kehle, S., Rath, M., Courage, C., Reddy, M. K. & Duffy, C. (2009). Impact of prior OEF/OIF combat duty on mental health in a pre-deployment cohort of National Guard Soldiers. *Military Medicine*, 174, 1-6.
- Polusny, M. A., Erbes, C. R., Arbisi, P. A., Thuras, P., Reddy, M. K., & Murdoch, M. (2009). *Prospective risk and resilience factors associated with PTSD symptoms in National Guard Soldiers deployed to Iraq*. Manuscript in preparation.
- Reddy, M. K., Polusny, M. A., & Murdoch, M. M. (2009). *Does counterbalancing affect symptom-reporting in trauma surveys?* Manuscript submitted for publication (under review).

APPENDICES

Peer Reviewed Publications

Polusny, M. A., Erbes, C. R., Arbisi, P. A., Thuras, P., Kehle, S., Rath, M., Courage, C., Reddy, M. K. & Duffy, C. (2009). Impact of prior OEF/OIF combat duty on mental health in a pre-deployment cohort of National Guard Soldiers. *Military Medicine*, 174, 1-6.

Ferrier-Auerbach, A.G., Kehle, S. M., Erbes, C. R., Arbisi, P. A., Thuras, P., & Polusny, M. A. (in press). Pre-deployment predictors of alcohol use in National Guard Soldiers. *Addictive Behaviors*.

Erbes, C. R., Polusny, M. A., MacDermid, S., & Compton, J. S. (2008). Couple therapy with combat veterans and their partners. *Journal of Clinical Psychology: In Session*, 64 (8), 972-983.

Paper Presentations

Polusny, M. A., Erbes, C. R., Arbisi, P. A., Thuras, P., Reddy, M. K., Erickson, D., Murdoch, M., Rath, M., & Courage, C. (2008, August). The Readiness and Resilience in National Guard Soldier Cohort Study. In M. A. Polusny, & P. A. Arbisi (Chairs), *Prospective predictors of resilience in OIF deployed National Guard Soldiers*. Symposium presented at the annual meeting of the American Psychological Association, Boston, MA.

Erbes, C. R., Polusny, M. A., Arbisi, P. A., Thuras, P., Reddy, M. K., Rath, M., & Courage, C. (2008, August). Prospective risk/resilience factors predicting in-theater and post-deployment PTSD symptoms. In M. A. Polusny, & P. A. Arbisi (Chairs), *Prospective predictors of resilience in OIF deployed National Guard Soldiers*. Symposium presented at the annual meeting of the American Psychological Association, Boston, MA.

Arbisi, P. A., Thuras, P., Reddy, M. K., Erbes, C. R., & Polusny, M. A. (2008, August). Neuroticism and introversion moderate distress in deployed National Guard Soldiers. In M. A. Polusny, & P. A. Arbisi (Chairs), *Prospective predictors of resilience in OIF deployed National Guard Soldiers*. Symposium presented at the annual meeting of the American Psychological Association, Boston, MA.

Ferrier-Auerbach, A. G., Kehle, S. M., Erbes, C. R., Arbisi, P. A., Thuras, P., & Polusny, M. A. (2008, November). Alcohol use in National Guard Soldiers pre- and post-deployment. In M. A. Polusny, & P. A. Arbisi (Chairs), *Prospective predictors of resilience in OIF deployed National Guard Soldiers*. Symposium presented at the annual meeting of the American Psychological Association, Boston, MA.

Polusny, M.A., Erbes, C. R., Arbisi, P. A., Thuras, P., Reddy, M. K., Kehle, S. M., Erickson, D., Murdoch, M., Rath, M., & Courage, C. (2008, November). *Mental health risk and resilience in OIF Deployment National Guard*

Soldiers: Prospective predictors. Paper presented at the annual meeting of the International Society for Traumatic Stress Studies, Chicago, IL.

Meis, L. A., Erbes, C. R., & Polusny, M. A. (2009, February). *Dyadic adjustment and PTSD symptoms among OIF veterans: Symptom clusters and pre to post-deployment functioning.* Paper presented at the 27th VA Health Services Research and Development National Meeting, Baltimore, MD.

Poster Presentations

Kehle, S. M., Polusny, M. A., Erbes, C., Arbisi, P. A., Thuras, P., Reddy, M. K., Murdoch, M. (2008, November). *Determinants of early mental health treatment seeking among a cohort of Iraq War National Guard Soldiers.* Poster presented at the annual meeting of the Association for Behavioral and Cognitive Therapies, Orlando, FL.

Kehle, S. M., Polusny, M. A., Erbes, C., Arbisi, P. A., Thuras, P., Reddy, M. K., & Murdoch, M. (2009, February). *Rates and predictors of mental health treatment seeking among Iraq War National Guard Soldiers.* Paper presented at the 27th VA Health Services Research and Development National Meeting, Baltimore, MD.

Reddy, M. K., Polusny, M. A., Erbes, C. R., Arbisi, P. A., & Murdoch, M. (2008, June). *Recruitment and retention of OIF Veterans in longitudinal research.* Poster presented at the Annual VA Research Day, Minneapolis Veterans Affairs Medical Center, Minneapolis, MN.

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Impact of Prior OEF/OIF Combat Duty on Mental Health in a Pre-deployment Cohort of
National Guard Soldiers

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PTSD, Military Readiness, Warfare

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Abstract

Objectives: The goal was to examine the impact of prior OEF/OIF combat deployment on reported psychiatric and somatic symptoms among National Guard/Reserve (NGR) soldiers one month before deployment to Iraq. **Method:** 522 NGR soldiers completed a survey assessing pre-deployment risk and resilience factors as well as current levels of PTSD, depressive and somatic symptoms. **Results:** Overall, soldiers reported few psychiatric symptoms present prior to deployment to Iraq. However, compared to soldiers preparing for their first deployment to Iraq, soldiers previously deployed to OEF/OIF reported more PTSD, depressive, and somatic symptoms. Previously OEF/OIF deployed soldiers reported lower perceptions of unit social support, but reported no differences in perceptions of preparedness or concerns about family disruptions. **Implications** for interventions and training with military personnel before deployment as well as future longitudinal research directions are discussed.

Impact of Prior OEF/OIF Combat Duty on Mental Health in a Pre-deployment Cohort of National Guard Soldiers

Introduction

With over 1.6 million U.S. troops serving combat deployments in Afghanistan (Operation Enduring Freedom; OEF) and Iraq (Operation Iraqi Freedom; OIF) since 2001, National Guard and Reserve (NGR) component soldiers have played an increasingly vital role in sustaining these military operations. Up until recently, NGR troops served one weekend a month and two weeks a year and were activated primarily to assist civilian authorities with local emergencies and natural disasters. For example, during the Vietnam War, approximately 28,000 Army and Air Guardsmen were called up for a year of active duty service, although only about 8,700 actually deployed to Vietnam. In contrast, as of November 2006, NGR component troops made up nearly half (46%) of the combat brigades in Iraq. This trend is likely to continue given the military's sustained high operational tempo. NGR soldiers will likely be called upon to serve not only for local emergencies and natural disasters, but also remain critical to supplementing active forces in OEF and OIF, making repeated extended combat deployments common¹. While a growing body of evidence has documented the cumulative impact of trauma exposure, little research has investigated the impact of repeated combat deployments on OEF/OIF soldiers' mental health. In addition, few studies have examined the relationship between prior combat exposure and other factors that may serve to mitigate or potentiate the impact of prior combat deployment on the mental health of NGR soldiers^{2;3}.

Combat exposure is associated with considerable risks of post-deployment mental health concerns, including posttraumatic stress disorder (PTSD)^{4;5}, depression⁶, substance abuse⁷, and physical health problems⁸. For example, nearly 19% of Vietnam veterans reported lifetime PTSD

in the National Vietnam Veterans Readjustment Study⁵. Similarly, as many as 17%-19% of active duty component soldiers screened positive for PTSD, depression, or anxiety upon returning from OEF/OIF^{9;10}.

Some reports indicate that NGR troops are at increased risk for the development of emotional or psychological complications compared to active duty troops¹¹. This risk for the development of psychiatric disorders appears to increase at a greater rate for NGR soldiers in the months and years following deployment^{12;13}. For example, Milliken and colleagues found that that rates of PTSD and depression more than doubled among NGR component soldiers between initial Post-Deployment Health Assessment and the Post-Deployment Health Reassessment conducted about 6 months later¹². The increase in emotional problems over time for NGR soldiers exceeded the rates found in regular active duty component service-members. In a three-wave longitudinal study of 2,949 Gulf War I veterans, Wolfe and colleagues found that NGR soldiers were at increased risk for developing PTSD over time¹³. Initially at Time 1, when soldiers were assessed about 4-5 days following their return from deployment to Gulf War I, NGR status was not associated with PTSD symptoms. However, NGR status independently contributed to the development of PTSD two years later in this same cohort.

Following deployment, NGR component soldiers may face unique reintegration challenges as they transition from warfighter back to civilian roles. Compared to active duty soldiers, NGR soldiers tend to be older and may be more likely to have left family and civilian work responsibilities outside the military¹⁴. As a result, NGR troops may face significantly greater familial and occupational strain both during and following deployment, and these challenges may contribute to NGR soldiers' elevated risk for mental health difficulties post-deployment. For instance, post-deployment stressful life events (e.g., occupational or legal

difficulties, marital disruptions) have been shown to be associated with higher rates of PTSD and depression¹⁵⁻¹⁷. Further, because they are not embedded with their military units following a combat deployment, NGR personnel may also have lower levels of support from social and occupational peers, which may also increase risk for PTSD¹⁷.

Sustained military operations in Iraq and Afghanistan have led to increased numbers of military personnel serving multiple combat tours. Two reports have addressed the issue of multiple deployments among active duty soldiers and Marines, but reached different conclusions. The third iteration of the Mental Health Advisory Team (MHAT-III) examined 1,122 soldiers and Marines during their deployment to Iraq¹. Service members with previous OIF deployments were found to have significantly higher levels of acute stress (post-traumatic stress symptomatology) than those on their first deployment. Active duty soldiers with previous OIF deployments were also at greater risk for developing other psychiatric complications. Specifically, they reported greater concerns about deployment length, family separation, and boring/repetitive work as well as significantly lower levels of unit morale than those on their first deployment¹.

On the other hand, Killgore and colleagues¹⁸ reported findings that seem to contradict the MHAT-III. In their sample of 2,068 active duty soldiers who were about to be deployed to Iraq, they found that the 8.3% of soldiers with previous combat deployments (in the first Gulf War, Somalia, or OIF) did not report higher levels of PTSD symptoms or rates. Prior combat service was associated with lower levels of affective symptoms and higher levels of somatic symptoms. They hypothesized that these findings indicated possible repression of distress with accompanying somatic amplification in soldiers about to be re-exposed to combat situations.

The timing of data collection (during versus prior to deployment) may account for the discrepant findings between the two studies, although MHAT-III hypothesized that increased psychiatric symptomatology found in previously deployed soldiers was due to pre-existing symptoms of PTSD¹, rather than the development of symptoms during the current deployment. The definition of prior deployment (only OIF versus prior combat deployment to OIF, Somalia or first Gulf War) may have also affected the findings. It is possible that combat conditions and psychological demands of deployments to Somalia (a peacekeeping mission) and first Gulf War (involving 40 days of aerial assaults and 5 days of ground combat) may be quite different from those of the sustained military operations in OEF and OIF.⁹ Clearly, more work is needed in examining the effects of multiple combat deployments in troops during and after combat tours. Additionally, we are aware of no studies on the effect of multiple combat deployments on NGR soldiers as they prepare for deployment.

The present study addresses these gaps in the literature by examining levels of mental health symptoms (post-traumatic stress, depressive, and somatic) and risk and resilience factors (unit support, perceived military preparedness, and concerns about family disruptions from the deployment) among NGR soldiers with and without prior OEF/OIF combat deployments.

Method

Procedures

Soldiers from a National Guard Brigade Combat Team, who were deployed to Iraq in March 2006, voluntarily completed a survey at Camp Shelby, Mississippi one month prior to deployment. Participants were recruited through unit announcements and flyers. Soldiers were provided a description and overview of the study and informed that their participation in the study was voluntary and confidential. After providing written informed consent, soldiers

completed the survey in group classrooms under standardized conditions with an investigator present to answer questions. The institutional review board at the Minneapolis Veterans Affairs Medical Center and the Minnesota National Guard command approved all procedures and materials.

Participants

Participants were 522 male and female National Guard soldiers from the 1st Brigade Combat Team of the 34th Infantry Division (1/34 BCT) who had completed approximately six months of training at Camp Shelby, Mississippi before being deployed to Iraq. The demographic profile of the study sample was very similar to that of the 1/34 BCT as a whole. Participants were primarily male (88.5%; $n = 462$), most were Caucasian (91.8%; $n = 479$), and nearly half of the participants were married (45.5%; $n = 237$). The mean age of participants was 29.1 ($SD = 8.6$), with 60% ($n = 313$) of soldiers between the ages of 18 and 29. The majority of participants were enlisted personnel (90.2%, $n = 471$), with 9.8% ($n = 51$) reporting a rank of officer or warrant officer. In terms of educational attainment, 26.6% ($n = 139$) reported a high school diploma, 41.2% ($n = 215$) reported some college, and 30% ($n = 157$) reported a college or graduate degree. Twenty-nine soldiers (5.6%) reported at least one prior deployment to OIF or OEF. Sample demographics for soldiers with and without a prior deployment to OEF or OIF are presented in Table 1.

Measures

Risk and Resilience Factors. Scales from the Deployment Risk and Resilience Inventory (DRRI)^{19;20} were used to assess key psychosocial resilience and risk factors for military personnel deployed to the Iraqi combat zone. The DRRI is ecologically valid and appropriate for use with military personnel participating in recent and current deployments and has been

successfully used in self-report and mail survey formats¹⁹. In samples of active duty and NGR component soldiers from Gulf War I, the DRRI showed predicted relationships with measures of mental health difficulty (PTSD, depression, general anxiety), physical health, and quality of life^{20;21}. We examined the following DRRI subscales: pre-deployment *Concerns about Life and Family Disruptions* (14 items, $\alpha = .80$ in the current sample) which measures individuals' concerns about the potential adverse effects deployment may have on important life domains; pre-deployment perceptions of *Preparedness* (10 items, $\alpha = .81$ in the current sample) for military deployment; and pre-deployment perceptions of *Unit Social Support* (12 items, $\alpha = .91$ in the current sample).

Post-traumatic stress disorder symptoms. PTSD symptoms were assessed using the PTSD Checklist (PCL)^{22;23}. This 17-item self-report scale uses a 5-point Likert scale ranging from "not at all" to "extremely" to evaluate the severity of PTSD symptoms severity using Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) criteria. The PCL has demonstrated excellent internal consistency ($\alpha = .94-.97$); in Vietnam veterans the 2 to 3 day test-retest reliability was $.96^{22}$. The PCL correlates highly with other interview and self-report measures of PTSD²². Alpha for the PCL total score in the current sample was $.92$.

Depressive symptoms. Depressive symptomatology was measured by the Beck Depression Inventory - II (BDI-II)²⁴, a widely used 21-item self-report measure of the severity of depressive symptoms. Respondents are asked to rate on a 4-point scale (0-3) how often they have experienced each item in the past two weeks. Scores greater than or equal to 20 suggest probable depression. The BDI-II has good internal consistency with an alpha coefficient of $.92$ for outpatients and $.93$ for college students; test-retest reliability over one week was $.93$. The BDI-II correlates with other measures of depressive symptoms, and construct validity of the

instrument has been well established. Alpha for the BDI-II total score for the current sample was .91.

Somatic symptoms. Questions from the Primary Care Evaluation of Mental Disorders (PRIME-MD)^{25;26} that assess common physical health complaints were used to assess somatic problems and health perceptions. This questionnaire includes 16 items that inquire about somatic complaints that comprise over 90% of physical complaints reported in outpatient settings²⁷ as well as 1 item that assesses general perception of one's physical health. Frequency ratings for the 16 symptom items were summed for a somatic distress score. The PRIME-MD demonstrated good internal consistency in the current sample ($\alpha = .83$).

Results

Differences in psychiatric and somatic complaints as well as risk and resilience factors between soldiers with and without prior OEF/OIF deployment were examined using analysis of variance (ANOVA). As shown in Table 2, soldiers with prior OEF/OIF exposure reported a greater number and increased severity of PTSD symptoms than soldiers not previously deployed to OEF/OIF, $F(1, 514) = 7.42, p < .01, \eta^2 = .014$. Previously OEF/OIF deployed soldiers also reported more depressive symptoms than those not previously deployed, $F(1, 514) = 6.11, p = .01, \eta^2 = .012$. Finally, soldiers with prior OEF/OIF deployment exposure reported greater somatic symptoms, $F(1, 514) = 3.89, p = .05, \eta^2 = .008$.

We examined differences on risk and resilience factors assessed by the DRRI between those soldiers who had a prior OEF/OIF deployment and those without prior OEF/OIF combat experience (see Table 3). There were no differences between soldiers with and without prior OEF/OIF combat deployment experience on perceptions of preparedness for deployment, $F(1, 516) = 1.09, p > .05, \eta^2 = .002$, or concern for family disruption, $F(1, 516) = 0.74, p > .05, \eta^2 =$

.001. However, soldiers who had prior OEF/OIF deployments reported lower perceptions of unit social support than those soldiers preparing for their first deployment to Iraq, $F(1, 516) = 5.01$, $p = .02$, $\eta^2 = .01$. Finally, we examined relationships between risk and resilience factors as measured by the DRRRI subscales (Preparedness, Concern for Family Disruption, and Unit Social Support) and symptom measures (PTSD, depressive and somatic symptoms or physical health complaints). Correlations between current symptoms and risk and resilience factors are presented in Table 4. Symptoms of PTSD and depression as well as somatic complaints present prior to deployment were significantly associated with soldiers' perceptions of being less prepared for deployment, having greater concerns about the impact of deployment on life and family, as well as reporting lower perceived social support by their unit.

Discussion

Overall, in the current study, the majority of National Guard soldiers reported low levels of psychiatric symptoms. These findings suggest that most National Guard soldiers were in good mental health prior to their current deployment to OIF. However, results of this study found elevated PTSD and depressive symptoms as well as greater somatic complaints prior to current OIF deployment among National Guard soldiers who had already served a prior OEF/OIF combat deployment. Soldiers previously deployed to OEF/OIF also reported lower perceptions of unit support, but showed no differences in perceptions of military preparedness or concerns about the deployment disrupting their life or family.

The findings of this study are consistent with and extend those reported by the MHAT-III in several ways. While the MHAT-III found that active duty personnel with prior OIF deployments had elevated PTSD symptoms during a subsequent deployment, we similarly found these differences in National Guard soldiers prior to deployment. We also found elevated levels

of depressive and somatic complaints present among previously OEF/OIF deployed National Guard soldiers as they prepared for their next deployment. Consistent with the MHAT-III findings, we found that prior OEF/OIF deployment was associated with lower perceptions of unit support. However, our study did not reveal differences between those with and without prior OEF/OIF deployment on other potential risk factors such as concerns about life and family disruption or perceptions of military preparedness for deployment.

Our results only partially replicated the findings of Killgore and colleagues¹⁹ who showed elevated rates of somatic complaints, but not PTSD or depression among those with prior deployments. Unlike their sample of active duty soldiers preparing for deployment to Iraq, we not only found increased somatic complaints, but also increased report of depressive and PTSD symptoms in previously deployed National Guard soldiers. Thus, it may be that National Guard soldiers experience greater psychiatric disturbances as the result of multiple deployments than active duty soldiers. However, as the MHAT-III obtained similar findings for previously deployed regular active duty component service-members, it is also possible that differences between the current study design and the Killgore et al study design, such as the period of the war, military status of investigators, or other circumstances in which questionnaires were administered, could account for the inconsistent findings.

Results of this study have a number of important implications for training and intervention with military personnel prior to deployment. On the one hand, the findings suggest that the vast majority of National Guard soldiers in our sample, even those with prior deployments, were not reporting clinically significant levels of psychiatric or emotional problems prior to deployment. It may be that most military personnel are resilient in the face of deployment, or that the extensive efforts on the part of medical personnel have ensured the

medical readiness of deploying troops. On the other hand, the low rates of pre-deployment psychiatric symptoms documented here may suggest that military screening programs and training are effective in preventing soldiers with severe distress from reaching the point of imminent deployment in most cases. Although soldiers who were previously deployed to OEF/OIF did report more symptoms across all symptom domains assessed, there were relatively small differences across the groups that may not result in noticeable performance differences for those soldiers with prior deployment experiences. On the other hand, these findings raise important questions about the cumulative effects of repeated deployments for National Guard soldiers and whether repeated combat deployments have the potential to erode the well-being and readiness of our nation's military personnel. Questions remain regarding whether soldiers with prior deployments will develop psychiatric complications at a higher rate upon their return home than soldiers who did not have a prior combat deployment. Further, it will be critical to identify what risk and protective factors may influence the mental health trajectories of soldiers who have served multiple deployments. To address these questions, we plan to follow this cohort and examine the impact of previous combat experience as well as a range of other risk and resilience factors on soldiers' post-deployment functioning over time.

Conclusions drawn in the current report have several limitations. Participants were self-selected and although demographically quite similar to the overall brigade, participants may have differed systematically from non-participants in terms of psychiatric symptoms or risk and resiliency factors. The number of soldiers with previous OEF/OIF combat deployments was small in the current pre-deployment sample, limiting the scope and confidence of analyses. Data were collected near the end of a six month validation training period during which troops' readiness for deployment was evaluated by medical personnel. It is possible that military

screenings may have affected the whole sample and population from which it was drawn. Data were self-reported and hence susceptible to recall errors and information biases. While valid and reliable, the measures utilized in this pre-deployment survey relied on self-report instruments. Future research should incorporate “gold standard” clinical interviews that allow for careful diagnosis of PTSD, depression, substance abuse and other post-deployment mental health problems. Finally, this report details only a single time point of assessment, and so cannot rule out possible longer-term deterioration or improvement in soldiers with multiple deployments over time.

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Table 1. *Demographics*

Variable	Pre-Deployment Sample	
	(n = 522)	
	Prior Deployment (n = 29)	No Prior Deployment (n = 493)
Age (years)	29.7 (7.8)	29.0 (8.7)
Marital Status (% married)	55.2%	44.8%
Ethnicity (% Caucasian)	93.1%	91.7%
Rank (% enlisted)	82.8%	90.7%

Table 2. *Pre-deployment symptoms by prior deployment status*

Measure	Prior Deployment Status	
	Prior Deployment	No Prior Deployment
PCL	31.2 (14.5)**	25.9 (9.6)
BDI-II	9.1 (9.2)*	5.8 (6.6)
PRIME-MD	3.9 (3.3)*	2.8 (2.9)

* $p < 0.05$, ** $p < 0.01$

Note. PCL = PTSD Checklist; BDI-II = Beck Depression Inventory – 2; PRIME-MD = Somatic Symptom Count from PRIME-MD.

Table 3. *Risk and resilience factors by deployment status*

Scale	Prior OEF/OIF Deployment	No Prior Deployment
Unit Social Support	36.6 (12.2)	40.9 (9.7)*
Life/Family Disruption	27.6 (9.5)	28.9 (7.4)
Preparedness	33.0 (8.7)	34.5 (7.3)

Notes. * $p < .05$.

Table 4. *Associations between risk and resilience factors and pre-deployment symptoms*

Variable	DRRI			DRRI	DRRI
	BDI-II	PRIME-MD	Preparedness	Unit Social Support	Life/Family Disruption
PCL	.74*	.51*	-.23*	-.28*	.27*
BDI-II		.57*	-.30*	-.42*	.24*
PRIME-MD			-.20*	-.23*	.25*
DRRI Preparedness					
Subscale				.51*	-.23*
DRRI Unit Social					
Support Subscale					-.24*

* $p < .001$

Note. PCL = PTSD Checklist; BDI-II = Beck Depression Inventory – 2; PRIME-MD = Somatic Symptom Count from PRIME-MD; DRRI = Deployment Risk and Resilience Inventory.

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Addictive Behaviors



Predictors of alcohol use prior to deployment in national guard soldiers

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ABSTRACT

Frequent and heavy alcohol use is associated with negative mental and physical health consequences. Previous research has suggested that alcohol misuse is associated with demographic, personality, and mental health variables. This study examined the relative contribution of these factors in predicting drinking among National Guard soldiers prior to deployment to a combat zone. Members of a National Guard Brigade Combat Team ($N=515$) completed questionnaires assessing drinking behaviors in the past year (frequency, quantity, binge, and total drinking), as well as demographic, personality, and mental health variables. As a group, demographic and personality variables significantly predicted all drinking outcomes. Negative emotionality and constraint were independent predictors of all drinking variables. Younger age predicted higher quantity of drinking, while being unmarried predicted greater total drinking and higher frequency of binge drinking. Once the influence of personality variables were accounted for, mental health was not associated with any drinking variable. The results of this study illustrate the role of factors associated with problematic drinking in a sample of high-risk individuals.

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1. Introduction

Alcohol use has long been part of military culture and is, in fact, more prevalent than alcohol use in even high-risk civilian populations, such as college students (Ames & Cunradi, 2004/2005). Despite recent concerns about the frequency and volume of alcohol consumption in the military (von Zielbauer, 2007), heavy drinking, defined as five or more drinks per typical drinking occasion, continues to increase among military personnel (Bray & Hourani, 2007). Heavy alcohol use in the general population has been associated with serious and potentially fatal health and social consequences, as well as negative consequences for emotional well-being and mental health (Macdonald, Wells, Giesbrecht, & Cherpitel, 1999; Stewart, 1996; Tseng, 2001). There is no reason to expect that the impact of heavy alcohol consumption would be lessened in military populations and in fact, drinking among military personnel may result in more serious consequences given the culture of drinking in the military and the physical and emotional demands of the military (Ames & Cunradi, 2004/2005).

Heavy alcohol use may occur throughout one's military career, but alcohol use in the context of mobilizing for combat deployment has recently received attention in the literature. Hoge et al. (2004) reported that 17% of Army soldiers used alcohol more than they

intended prior to deployment to Iraq, while 13% of Army soldiers felt they needed to cut down on their drinking prior to deployment. Individuals who are about to be deployed may drink excessively as a way to cope with the emotions associated with being deployed. This pattern of drinking prior to deployment may become more problematic and potentially impact others in the unit, particularly as it may be continued in theater as a way to cope with the stress of combat (Lande, Marin, & Ruzek, 2003). Most studies of alcohol use in the military focus on drinking behaviors among active duty military personnel, as opposed to National Guard or reserve components of the military. Members of the Reserve or National Guard may be at higher risk for heavy weekly drinking, binge drinking, and negative alcohol-related consequences than active duty members of the military, possibly because members of the Reserve or National Guard must transition between military and civilian settings and may not feel adequately prepared for deployment stresses (Jacobson et al., 2008). In an effort to better understand drinking that occurs in a military context, researchers have used factors that have been found to contribute to drinking in civilian populations. Demographic factors, such as having lower levels of education and being younger, White, male, and unmarried have all been found to be related to greater alcohol consumption (Ames & Cunradi, 2004/2005; Bray et al., 2003; Bray & Hourani, 2007; Jacobson et al., 2008; Tseng, 2001).

Other factors related to drinking behaviors in civilian populations emerge from the broad and interrelated categories of personality and

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mental health (e.g., Adams, Boscarino, & Galea, 2006; Krueger & Markon, 2006; Marsh & Dale, 2005). Krueger, McGue, and Iacono (2001) described two higher-order personality factors, labeled internalizing and externalizing, associated with different patterns of alcohol consumption. In general, individuals who tend toward internalizing spectrum disorders are characterized by high negative emotionality (neuroticism), while individuals who tend more toward the externalizing spectrum exhibit high levels of negative emotionality combined with high levels of disinhibition, or the tendency toward disinhibition (Krueger & Markon, 2006; Krueger, Markon, Patrick, Benning, & Kramer, 2007). High scores on measures of disinhibition and negative emotionality are associated with substance-related disorders (Arbisi, Polusny, Erbes, Thuras, & Kehle, 2007; Bradizza, Stasiewicz, & Paas, 2006; Krueger, 1999; Miller, Vogt, Mozley, Kaloupek, & Keane, 2006). Taken together, findings across a variety of settings and conditions have pointed to a strong relationship between substance use and personality, and it is likely that individuals with certain personality types, particularly those with high levels of negative emotionality and low levels of constraint (externalizing individuals), are more likely to engage in heavy alcohol use.

The presence of a mental health condition also appears to be associated with alcohol misuse. According to the Substance Abuse and Mental Health Services Administration (2005), serious psychological distress is associated with binge (defined as five or more drinks on at least one occasion in the past 30 days) and heavy drinking. In particular, there appears to be high comorbidity between depression and alcohol use (Adams et al., 2006; Compton, Conway, Stinson, & Grant, 2006).

Heavy use of alcohol also appears to be associated with posttraumatic stress disorder (PTSD). This condition is particularly relevant to individuals in the military, who are frequently exposed to traumatic combat situations. A recent study found that 43.9% of a sample of members of the British Armed Soldiers who met criteria for PTSD also screened positive for severe alcohol problems (Rona et al., 2008). It is well known that PTSD and substance use disorders are highly comorbid. The mechanism of association between PTSD and alcohol use is not entirely understood, but recent findings point to a causal role for PTSD in the development of heavy alcohol consumption, where an individual first develops a distress syndrome such as PTSD after being exposed to a traumatic event, then turns to alcohol as a way to self-medicate the emotional suffering (Marsh & Dale, 2005; Ruzek, 2003). However, the relationship between alcohol use and PTSD may be bi-directional; heavy alcohol use may lead to emotional dysfunction as well, perhaps by increasing the likelihood that one will develop PTSD following a traumatic event or experience more severe symptoms of PTSD (e.g., Stewart, 1996). The vulnerability to PTSD that may be conferred by heavy alcohol use is likely to be particularly important for individuals who engage in heavy drinking immediately prior to deploying to a combat zone, as it may increase the likelihood that these individuals will later be diagnosed with PTSD or other mental health issues, such as other anxiety disorders (Kushner et al., 2000).

More recent work has suggested that personality and mental health symptoms may interact in their relationship to alcohol problems. Wakiza, Watson, and Doebbeling (2007) found PTSD to be more robustly related to underlying personality traits than to the presence of other anxiety disorders. The development of PTSD and psychiatric comorbidity after exposure to traumatic events is likely to be closely related to underlying personality traits mustered to cope with the emotional reaction to the event. For example, when individuals with diagnoses of PTSD were classified into groups based on internalizing and externalizing personality traits, individuals with externalizing PTSD were more likely to exhibit high negative emotionality and low levels of constraint. Further, the externalizing individuals were more likely than those with internalizing PTSD to have comorbid alcohol-related disorders (Miller, 2003; Miller,

Kaloupek, Dillon, & Keane, 2004). However, individuals with both internalizing and externalizing subtypes of PTSD exhibited relatively high levels of substance abuse compared with individuals who did not carry a PTSD diagnosis. These studies provide evidence of the importance of integrating information on multiple risk factors for substance use, with special attention to enduring temperamental factors that may set the stage for the development of comorbid psychiatric conditions.

Although alcohol misuse poses a problem for military personnel who are about to be deployed, no study has yet examined the relative contribution of a broad range of factors that may be involved in heavy drinking during the period of mobilization prior to combat deployment in a sample of National Guard soldiers. The goal of the current study is to examine known predisposing factors that may be involved in misuse of alcohol prior to deployment, including demographic factors, personality variables, and prior mental health as they relate to drinking behaviors. We hypothesize that higher alcohol use in the military will be associated with (a) demographic variables, including younger age, male gender, Caucasian status, lower levels of education, and unmarried status; (b) personality variables, including higher levels of negative emotionality and disinhibition; and (c) pre-deployment mental health, including higher levels of PTSD and depression. Most research on drinking in the military focuses generally on drinking among active duty components of the military rather than identifying factors specific to Army National Guard soldiers. The research that has focused on differences between active duty and Reserve or Guard units has suggested that Reserve and National Guard personnel are more likely to experience negative alcohol-related consequences than are active duty personnel (Jacobson et al., 2008). The goal of the current study was therefore to provide a closer examination of the relative contributions of known predisposing factors in a high-risk sample of Army National Guard soldiers.

2. Method

2.1. Participants and procedure

Participants in the study were taken from 522 National Guard soldiers from a brigade combat team mobilized for deployment to Iraq who consented to participate and submitted anonymous responses to a paper-and-pencil pre-deployment survey. Of those 522 soldiers, 515 provided data on alcohol use and were included in analyses. The cohort of soldiers was recruited via flyers and announcements in their unit and surveyed in small groups approximately one month prior to deployment, while they were undergoing intense training and preparation for deployment to Operation Iraqi Freedom (OIF). Participants had learned that they were to be deployed approximately 12 months prior to mobilization. The majority of the 515 participants (478 participants, or 92.8%) were White. Because other ethnocultural groups were not well-represented in this sample, ethnocultural group in the present study was coded as either White or Non-White. The sample ranged in age from 18 years to 57 years old with the majority of participants between the ages of 18–29 (309 participants, or 60.0%). The median age of the participants in the sample was 26 years. The majority of participants were male (455 participants, or 88.3%). A small number of participants had been previously deployed (123, or 23.9% of participants, 5.6% of whom had been previously deployed to OIF) and 280 participants, or 54.4%, were not currently married. The average number of years of education in this sample was 14.2 years. Our sample was considered to be representative of the larger unit from which it was drawn, in which the majority was also White (93.6%), male (90.9%), and enlisted rank (89.5%). All procedures were approved by relevant Institutional Research Boards and the relevant National Guard command.

2.2. Measures

2.2.1. Demographics questionnaire

Participants completed a brief demographics questionnaire that included information such as age, gender, racial/ethnic origin, marital status, military rank, and previous deployment.

2.2.2. Alcohol use

We assessed alcohol use using the 4-item set of questions from the National Council on Alcohol Abuse and Alcoholism Recommended Sets of Alcohol Consumption Questions (NIAAA, 2003). We were interested in examining patterns of drinking over the past year, which was expected to be an indicator of drinking in the context of an upcoming deployment. In particular, we were interested in examining different patterns of drinking (e.g., low-grade, steady drinking versus heavy episodic drinking, etc.). The following alcohol use variables were assessed through a self-report questionnaire to examine different styles of drinking: (a) frequency of drinking, measured as the number of days in the past year that alcohol was consumed ("During the last 12 months, how often did you usually have any kind of drink containing alcohol?"); (b) quantity of drinking, measured as the typical number of drinks per drinking day in the past year ("During the last 12 months, how many alcoholic drinks did you have on a typical day when you drank alcohol?"); (c) a composite measure reflecting total drinking, which was created by multiplying drinking quantity by drinking frequency to create a score reflecting total drinks consumed in the past year; and (d) frequency of binge drinking in the past year, measured as the number of days a participant binge drank in the past year ("During the last 12 months, how often did you have 5 or more (males) or 4 or more (females) drinks containing any kind of alcohol within a two-hour period?"). In this sample, a binge was defined as consuming five or more drinks in a two-hour period for a man, or four or more drinks within a two-hour time period for a woman. A standard drink was defined as half an ounce of absolute alcohol (e.g., a 12 ounce can or glass of beer or cooler, a 5 ounce glass of wine, or a drink containing 1 shot of liquor).

2.2.3. PTSD checklist (PCL; Weathers, Litz, Herman, Huska, & Keane, 1993)

The PCL is a 17-item self-report measure designed to assess severity of PTSD symptoms. Participants are asked to rate on a 5-point Likert scale how much each of 17 symptoms has bothered them in the past month. Endorsement of PTSD symptoms is evaluated by summing the individual items to create a total score. This measure has been found to have good overall diagnostic efficiency, using the DSM-IV criteria for PTSD, of .83 (Blanchard, Jones-Alexander, Buckley, & Forneris, 1996). The PCL is considered to have good reliability and validity (Weathers et al., 1993) and is one of the most widely-used self-report measures of PTSD symptoms. Internal consistency, as measured by coefficient alpha, was found to be .92 in our sample.

2.2.4. Beck Depression Inventory (BDI-II; Beck, Steer, & Brown, 1996)

The BDI-II is one of the most widely-used self-report inventories of depression and includes 21 items that, summed, assess severity of depressive symptoms. The measure is typically used both to screen for and measure severity of depression. The psychometric properties of the BDI-II are well-established, e.g., coefficient alpha was found to be .93 in a population of outpatients who were diagnosed with various DSM-IV mental disorders (Beck et al., 1996) and .89 in a non-treatment seeking student sample (Whisman, Perez, & Ramel, 2000). In our sample, internal consistency was found to be .91.

2.2.5. MMPI-2, PSY-5 scales (Harkness, McNulty, & Ben-Porath, 1995)

Abbreviated versions of the PSY-5 scales from the MMPI-2 were used to measure personality. The PSY-5 scales correspond to five broad higher-order factors of personality: positive emotionality (PEM), or extraversion; negative emotionality (NEM) or neuroticism; constraint

(CON); aggressiveness; and psychoticism. Three of these scales designed to assess PEM, NEM, and CON (PEM is reversed so that higher scores reflect an absence of positive emotionality, as reflected in the PSY-5 scale name introversion/low positive emotionality) were used in the present study to assess personality factors that have been associated with alcohol use in previous studies (e.g., Graham, Ben-Porath, & McNulty, 1999; Miller et al., 2004). Given time constraints in the context of pre-deployment data collection, abbreviated versions of the PSY-5 scales were used, in which 16 out of the 29 items on the full scale were used to measure disinconstraint, 23 out of 33 items were used to measure negative emotionality, and 20 items out of 34 items on the full scale were used to measure introversion (a measure of PEM). Internal consistency, as measured by Cronbach's alpha, was as follows for all abbreviated versions of the subscales: .57 for disinconstraint, .82 for negative emotionality/neuroticism, and .62 for introversion/low positive emotionality. The reliabilities of the reduced scales used in this sample are comparable to those found by the scale developers in non-clinical populations (e.g., alpha of .71 for disinconstraint, .84 for negative emotionality/neuroticism, and .71 for introversion/low positive emotionality; Harkness et al., 1995). Given the breadth of the personality dimensions assessed and the considerably shortened scales, internal consistencies were felt to be adequate.

2.3. Analyses

The tests of the contributions of each of the demographic, personality, and mental health factors were accomplished through hierarchical multiple linear regression analyses. Variables were entered in blocks of factors, moving from most to least temporally stable. We entered age, gender, race, years of education, and marital status in the first block. We entered the personality variables disinconstraint, introversion/low positive emotionality, and negative emotionality/neuroticism in the second block. In the third and final block, we entered mental health variables, including level of PTSD and depressive symptoms. Four different regression equations were performed, with four different alcohol use variables reflecting alcohol use as the dependent variable: Frequency of drinking in the past year (number of days in the past year during which someone drank), quantity of drinking in the past year (average number of drinks consumed in one sitting), total average drinking (calculated as the product of average quantity of drinks per day by the number of drinks consumed on an average day), and number of binge drinking episodes in the past year. To reduce the possibility of Type 1 error, we report only those variables in the regressions that were significant at the $p < .01$ level. As suggested by previous research, it was expected that demographic, personality, and mental health variables would all contribute independently to soldiers' engagement in heavy drinking.

3. Results

3.1. Quantity and frequency of alcohol use prior to deployment

Rates of missing data were less than 3% for all variables. Analyses were conducted with listwise deletion to account for missing data. In the present sample, 10 soldiers (1.9%) reported that they had never consumed alcohol and were excluded from final analyses. We asked participants about their heaviest drinking episodes within the past year, as well as their average drinking behaviors. With regard to frequency of drinking in the past year, 2.7% said they had not consumed alcohol in the past year, while the mean number of drinking days in the past year was approximately 85.9. With regard to average quantity of drinking per drinking episode in the past year, the mean number of drinks was 4.7. Finally, with regard to the frequency of binge drinking, 26.8% of this sample reported that they engaged in binge drinking at least once per week.

3.2. Rates of psychological distress prior to deployment

The rates of probable PTSD in this sample were relatively low, which is consistent with a sample of individuals who must be healthy enough to prepare for an upcoming deployment. In this sample, approximately 7% of the sample met criteria for PTSD based on meeting reexperiencing, avoidance, and hyperarousal criteria on the PCL. Approximately 6% of our sample endorsed symptoms on the BDI indicative of depression.

3.3. Factors associated with alcohol use prior to deployment

Bivariate correlations are listed in Table 1. In this sample, zero-order correlations identified relationships between all drinking variables and age, marital status, the personality variables disinhibition and negative emotionality/neuroticism, and PTSD symptoms. In addition, gender exhibited a significant bivariate correlation with drinking quantity, while symptoms of depression were associated with drinking frequency and total drinking. Years of education exhibited significant bivariate correlations with drinking frequency, drinking quantity, and total drinking. The personality variable of introversion/low positive emotionality was associated with frequency of binge drinking.

Drinking variables, as expected, showed considerable skew and heteroskedasticity. Standardized skewness scores for frequency of drinking, quantity of drinking, total average drinking, and number of binge drinking episodes were calculated to be 10.20, 12.45, 26.72, and 20.26, respectively. Standardized kurtosis values for frequency of drinking, quantity of drinking, total average drinking, and number of binge drinking episodes were found to be 2.99, 8.21, 52.48, and 22.61, respectively. Although our sample size is large enough to provide a robust statistic with respect to non-normality, data was analyzed with both multiple linear regression and negative binomial regression, which does not assume normally distributed data. As we expected, results were nearly identical for the two approaches. Consequently, we present results of the more conventional multiple linear regression analyses here.

3.3.1. Frequency of drinking

We first examined frequency of drinking in the past year. Only the steps containing demographic and personality variables significantly added to the variance in number of drinking days in the past year [$F(5, 483) = 5.24, p < .001, R^2 \text{ change} = .05$; and $F(3, 480) = 14.23, p < .001, R^2 \text{ change} = .08$, respectively]. When we examined the contribution of individual variables to frequency of drinking, only the personality

Table 1

Bivariate correlations between predictor variables and alcohol use variables ($N = 474$).

Variable	Drinking frequency	Drinking quantity	Total drinking	Binge frequency
Age	-.17**	-.34**	-.22**	-.25**
Gender	-.03	-.12*	-.08	-.08
White	-.02	-.03	-.03	-.06
Years of education	-.03	-.25**	-.14**	-.17**
Marital status	-.17**	-.25**	-.22**	-.23**
MMPI-2 disinhibition	.26**	.34**	.29**	.28**
MMPI-2 negative emotionality/neuroticism	.23**	.30**	.27**	.26**
MMPI-2 introversion/low positive emotionality	-.06	-.09	-.05	-.10*
PCL total score	.16**	.16**	.19**	.19**
BDI-2 total score	.10*	.07	.10*	.09

Notes. MMPI-2 = Minnesota Multiphasic Personality Inventory-2; PCL = PTSD Checklist; BDI-2 = Beck Depression Inventory-2.

* $p < .05$. ** $p < .01$.

Table 2

Summary of hierarchical multiple linear regression analysis for variables predicting frequency of drinking in the past year ($N = 489$).

Variable	B	SE B	β
Block 1			
Age	-1.39	.53	-.14*
Gender	-17.35	11.63	-.07
White	-14.39	14.86	-.04
Years of Education	1.43	1.99	.03
Marital Status	-21.81	8.62	-.13
Block 2			
Age	-.57	.53	-.06
Gender	-5.76	11.75	-.02
White	-11.69	14.46	-.04
Years of education	2.74	1.93	.07
Marital status	-18.28	8.32	-.11
MMPI-2 disinhibition	6.59	1.57	.20*
MMPI-2 negative emotionality/neuroticism	3.80	.98	.19*
MMPI-2 introversion/low positive emotionality	-1.96	1.39	-.07
Block 3			
Age	-.64	.53	-.07
Gender	-3.01	12.08	-.01
White	-10.70	14.50	-.03
Years of education	2.97	1.94	.07
Marital status	-18.06	8.38	-.11
MMPI-2 disinhibition	6.55	1.57	.20*
MMPI-2 negative emotionality/neuroticism	3.62	1.22	.18*
MMPI-2 introversion/low positive emotionality	-1.68	1.44	-.06
PCL score	.66	.57	.08
BDI-2 score	-.88	.88	-.07

Notes. MMPI-2 = Minnesota Multiphasic Personality Inventory-2; PCL = PTSD Checklist; BDI-2 = Beck Depression Inventory-2.

$R^2 = .05^{**}$ for Block 1; $\Delta R^2 = .08^{**}$ for Block 2; $\Delta R^2 = .00$ for Block 3.

* $p < .01$.

variables of disinhibition and negative emotionality emerged as significant unique predictors of drinking frequency (see Table 2) [$F(10, 478) = 7.24, R^2 = .13$, adjusted $R^2 = .11$ for full model].

Table 3

Summary of hierarchical multiple linear regression analysis for variables predicting quantity of drinking in the past year ($N = 498$).

Variable	B	SE B	β
Block 1			
Age	-.11	.02	-.25*
Gender	-1.84	.48	-.16*
White	-1.05	.60	-.07
Years of education	-.25	.08	-.14*
Marital status	-.91	.36	-.12
Block 2			
Age	-.07	.02	-.17*
Gender	-1.25	.48	-.11*
White	-.95	.58	-.07
Years of education	-.18	.08	-.10
Marital status	-.70	.34	-.09
MMPI-2 disinhibition	.34	.06	.24*
MMPI-2 negative emotionality/neuroticism	.17	.04	.19*
MMPI-2 introversion/low positive emotionality	-.10	.06	-.08
Block 3			
Age	-.08	.02	-.18*
Gender	-1.06	.49	-.09
White	-.90	.58	-.06
Years of education	-.17	.08	-.09
Marital status	-.75	.34	-.10
MMPI-2 disinhibition	.34	.06	.23*
MMPI-2 negative emotionality/neuroticism	.20	.05	.22*
MMPI-2 introversion/low positive emotionality	-.08	.06	-.06
PCL score	.02	.02	.05
BDI-2 score	-.06	.04	-.11

Notes. MMPI-2 = Minnesota Multiphasic Personality Inventory-2; PCL = PTSD Checklist; BDI-2 = Beck Depression Inventory-2; DRR = Deployment Risk and Resiliency Inventory.

$R^2 = .17^{**}$ for Block 1; $\Delta R^2 = .10^{**}$ for Block 2; $\Delta R^2 = .01$ for Block 3.

* $p < .01$.

Table 4

Summary of hierarchical multiple linear regression analysis for variables predicting total drinking in the past year ($N = 496$).

Variable	<i>B</i>	<i>SE B</i>	β
Block 1			
Age	−13.31	4.76	−.15*
Gender	−282.82	104.89	−.12*
White	−133.59	132.32	−.04
Years of education	−23.03	17.73	−.06
Marital status	−244.29	77.11	−.16*
Block 2			
Age	−5.81	4.66	−.06
Gender	−170.15	104.84	−.07
White	−118.75	127.97	−.04
Years of education	−10.19	17.05	−.03
Marital status	−203.56	74.10	−.13*
MMPI-2 disinconstraint	65.01	13.69	.22*
MMPI-2 negative emotionality/neuroticism	36.79	8.70	.20*
MMPI-2 introversion/low positive emotionality	−15.41	12.41	−.06
Block 3			
Age	−6.74	4.69	−.07
Gender	−132.49	107.48	−.06
White	−105.39	128.00	−.03
Years of education	−7.33	17.13	−.02
Marital status	−201.98	74.43	−.13*
MMPI-2 disinconstraint	64.12	13.68	.21*
MMPI-2 negative emotionality/neuroticism	34.94	10.77	.19*
MMPI-2 introversion/low positive emotionality	−11.37	12.81	−.04
PCL score	8.86	5.05	.12
BDI-2 score	−12.36	7.81	−.11

Notes. MMPI-2 = Minnesota Multiphasic Personality Inventory-2; PCL = PTSD Checklist; BDI-2 = Beck Depression Inventory-2; DRRI = Deployment Risk and Resiliency Inventory.

$R^2 = .09^{**}$ for Block 1; $\Delta R^2 = .09^{**}$ for Block 2; $\Delta R^2 = .01$ for Block 3.

* $p < .01$.

3.3.2. Quantity of drinking

We then examined the factors related to quantity consumed on a typical drinking day within the past year. When examining groups of variables, only demographic and personality variables significantly accounted for variance in typical quantity of drinking [$F(5, 492) = 20.11, p < .001, R^2 \text{ change} = .17$; and $F(3, 489) = 20.94, p < .001, R^2 \text{ change} = .10$, respectively]. When we examined the independent contributions of factors to drinking quantity, we found that age and the personality factors of disinconstraint and negative emotionality were significantly related to drinking quantity (see Table 3) [$F(10, 487) = 17.90, R^2 = .27$, adjusted $R^2 = .25$ for full model].

3.3.3. Total drinking

For the tests of total drinking in the past year, or the combination of quantity and frequency of drinking within the past year, demographic variables and personality variables both added significant amounts of variance to the total amount of alcohol consumed in the past year [$F(5, 490) = 9.34, p < .001, R^2 \text{ change} = .09$; and $F(3, 487) = 17.03, p < .001, R^2 \text{ change} = .09$, respectively]. However, with regard to the contribution of individual variables, marital status, disinconstraint, and negative emotionality were all significantly related to total drinking (see Table 4).

3.3.4. Frequency of binge drinking

For the tests of frequency of binge drinking within the past year, a similar pattern of results emerged. As a group, demographic and personality variables accounted for significant amounts of variance in binge frequency [$F(5, 480) = 11.35, p < .001, R^2 \text{ change} = .11$ and $F(3, 477) = 16.89, p < .001, R^2 \text{ change} = .09$, respectively]. However, when independent predictors within the final model were examined, only marital status and the personality variables of disinconstraint and negative emotionality were significantly related to frequency of binge drinking in the past year (see Table 5) [$F(10, 475) = 11.72, R^2 = .20$, adjusted $R^2 = .10$ for full model].

4. Discussion

These results suggest that several variables contribute to different drinking behaviors in a National Guard sample prior to deploying to a combat zone. First, demographic factors, particularly age and marital status, significantly added to our understanding of all measures of drinking in the past year. Within this group of variables, being unmarried was associated with drinking more total alcohol over the course of a year and greater frequency of binge drinking. Younger age was associated with higher quantity of drinking on a typical drinking day, suggesting that in our population, younger individuals drank more heavily but did not engage more frequently in binge drinking. This is in contrast to other studies involving largely active duty military personnel that have suggested that younger military personnel are more likely to binge drink (Bray et al., 2003); in our sample of National Guard soldiers, the culture of binge drinking may have transcended age group.

Personality factors were also associated with greater amounts of drinking in the past year. Consistent with study hypotheses, individuals who were higher in disinconstraint and negative emotionality drank more frequently, drank more alcohol per occasion, had a higher quantity of total alcohol consumption, and engaged more frequently in binge drinking. This finding is not unexpected, given previous research that suggests that disinconstraint, or poorer impulse control, is associated with drinking behaviors, while individuals are also more likely to drink if they are attempting to “self-medicate” or cope with negative emotions (Miller et al., 2004; Ruzek, Polusny, & Abueg, 1998).

Measures of mental health did not, as a whole or individually, significantly predict any of the drinking variables studied in this paper once demographic and personality variables were controlled for. However, bivariate correlations suggested that symptoms of PTSD in particular had strong individual correlations with all drinking measures used in this study. Therefore, while symptoms of PTSD are

Table 5

Summary of hierarchical multiple linear regression analysis for variables predicting frequency of binge drinking in the past year ($N = 486$).

Variable	<i>B</i>	<i>SE B</i>	β
Block 1			
Age	−1.19	.39	−.16*
Gender	−22.93	8.54	−.12*
White	−19.54	10.57	−.08
Years of education	−2.74	1.45	−.09
Marital status	−20.10	6.32	−.16*
Block 2			
Age	−.56	.38	−.07
Gender	−15.84	8.56	−.08
White	−16.70	10.21	−.07
Years of education	−1.78	1.39	−.06
Marital status	−16.69	6.06	−.13*
MMPI-2 disinconstraint	4.65	1.13	.18*
MMPI-2 negative emotionality/neuroticism	3.22	.71	.21*
MMPI-2 introversion/low positive emotionality	−2.27	1.01	−.10
Block 3			
Age	−.64	.39	−.09
Gender	−12.26	8.78	−.06
White	−15.60	10.21	−.06
Years of education	−1.49	1.40	−.05
Marital status	−16.74	6.08	−.13*
MMPI-2 disinconstraint	4.57	1.13	.19*
MMPI-2 negative emotionality/neuroticism	3.31	.87	.21*
MMPI-2 introversion/low positive emotionality	−1.86	1.04	−.08
PCL score	.65	.41	.10
BDI-2 score	−1.17	.64	−.13

Notes. MMPI-2 = Minnesota Multiphasic Personality Inventory-2; PCL = PTSD Checklist; BDI-2 = Beck Depression Inventory-2; DRRI = Deployment Risk and Resiliency Inventory.

$R^2 = .11^{**}$ for Block 1; $\Delta R^2 = .09^{**}$ for Block 2; $\Delta R^2 = .01$ for Block 3.

* $p < .01$.

associated with heavier drinking behaviors, once negative emotionality was controlled for, drinking behaviors were not uniquely related to mental health symptoms. Given that negative emotionality is a personality factor that predisposes individuals to react in a certain way to high levels of stress (e.g., by developing PTSD), it may be that negative emotionality represents a higher-order factor that better explains the propensity to drink more alcohol per occasion and more frequently. It is possible that the PCL may be more of a measure of general distress in this sample rather than symptoms specific to PTSD. It may also be that because our sample was a relatively healthy sample (rates of PTSD prior to deployment were low), the influence of PTSD symptoms was not detected in this sample but in a sample with a greater range of PTSD severity, the results might be quite different.

Given the health and social problems associated with heavy alcohol use, the results of the present study add to the literature in important ways. First, this study is one of the first to examine drinking behaviors in members of the National Guard who are in the process of preparing for an upcoming deployment. National Guard and Reserve populations have previously been suggested to be at higher risk for alcohol-related problems than active duty samples (Jacobson et al., 2008). In addition, we used four different measures of alcohol use to explore the different types of drinking that individuals may engage in. The results of this study have important implications for prevention and treatment of alcohol-related problems. Although certain factors, such as demographic and personality factors, are often either unchangeable or difficult to change, understanding how they may confer risk or protection (e.g., being married) for increased drinking may help identify at-risk individuals and inform treatment. Identification of at-risk individuals may be especially important, given research that suggests that despite high rates of alcohol misuse, referrals for treatment for substance abuse are surprisingly low among military personnel (Milliken, Auchterlonie, & Hoge, 2007). In our study, younger age was only associated with amount of alcohol consumed on a typical day. Individuals in the military who are younger may not be more likely to binge drink but may be more likely to consume higher amounts of alcohol than other individuals. These individuals may respond to interventions such as motivational enhancement or individualized feedback that provide information on appropriate and safe amounts to drink as well as the possibility that drinking may actually increase symptoms of PTSD (Ouimette, Brown, & Najavits, 1998).

Similarly, we found that personality variables were highly associated with drinking patterns. A greater understanding of how personality variables are associated with increased alcohol consumption may be used to prevent consequences of heavier drinking. Individuals who enter the military environment with high levels of disinhibition, negative emotionality, or both are more likely than individuals who do not have high levels of these personality traits to engage in heavier drinking behaviors. Knowledge of the relationship between certain personality factors and drinking behaviors may help clinicians match treatment to personality (Harkness & Lilienfeld, 1997) or allow clinicians or military personnel to identify individuals who are most at-risk for developing alcohol-use disorders. Individuals who are high in negative emotionality but not high in disinhibition, or sensation-seeking, may be more likely to need treatment such as group or individual therapy that is specifically tailored to learning to manage or cope with negative emotions that may be an underlying cause of drinking, while those who are high in disinhibition may need treatment, such as individualized feedback or therapy, that teaches them more appropriate ways to manage impulsive behaviors.

There were several limitations to this study. First, the information in this sample was collected approximately one month prior to deployment, and the data collected did not allow us to examine the temporal pattern of changes in alcohol use in the past year. Because of the cross-sectional nature of our data, it is possible that the drinking behaviors observed in this study occurred in response to learning

about their upcoming deployment, or they may simply reflect typical drinking behaviors of military personnel. Future studies could more specifically examine whether or not the drinking patterns noted in this study are temporary or whether alcohol use changes as a result of learning of an upcoming deployment. Additionally, our questions assessed depressive symptoms and symptoms of PTSD within the past month. Utilizing a longitudinal design in the future may help provide information about the relationship between mental health factors and changes in drinking behavior.

Second, the modest internal consistency of the abbreviated PSY-5 scale of disinhibition must be noted. However, we found significant results for all of our drinking variables using this scale, which suggests that the effect of disinhibition on drinking variables is quite robust. Third, our sample consisted almost entirely of Caucasian National Guard soldiers. Given that drinking behaviors differ somewhat across different branches of the military (Ames & Cunradi, 2004/2005), care should be taken before generalizing the results of this study to other ethnocultural groups or other branches of the military. Future studies could address this issue by replicating this study among other branches of the military or in areas of the country that may include a more representative sample of the American population. Additionally, future studies may want to include more detailed information about the history of one's drinking behaviors as well as one's motives for drinking.

The culture of drinking has been woven into the fabric of the military for many years, but given increasing awareness of the potentially negative effects of this alcohol use, it has become imperative that studies add to our understanding of risk factors for heavy alcohol use. Our study examines factors that had been known to increase likelihood of heavier drinking in civilian populations in a uniquely high-risk military population. In turn, we hope that this understanding of risk factors will be able to lead to increased awareness of individuals at risk and therefore reduce the negative consequences that may result from heavy alcohol use by leading to early intervention and prevention of alcohol use disorders.

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Couple Therapy With Combat Veterans and Their Partners



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Service members returning from Iraq and Afghanistan face psychological challenges that can exert profound effects on families and couples, but can also be treated within a systemic context. Couple therapy offers a means of increasing social support, decreasing interpersonal conflict, and addressing the experiential avoidance that maintains posttraumatic symptoms. For combat veterans and their partners, we present an adaptation of integrative behavioral couple therapy (IBCT) that reduces conflict and encourages intimacy through acceptance and skills strategies. By doing so, IBCT exposes service members in couple therapy to emotions, interpersonal situations, and activities that facilitate recovery from combat-related distress. We illustrate common presenting problems in this population and the utilization of IBCT with a case example. © 2008 Wiley Periodicals, Inc. *J Clin Psychol: In Session* 64:972-983, 2008.

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More than 1,600,000 U.S. military service personnel have served in the wars in Iraq and Afghanistan. For many service members, the stress and consequences of combat deployments do not resolve upon their return home. There has been a gradual acknowledgement of the importance of family and couple therapies for this population. In this article, we briefly review the rationale and utility of couple therapy with returning service members. We will discuss recent developments in treating combat-related distress using couple therapy focusing on the application of integrative behavioral couple therapy (IBCT; Jacobson & Christensen, 1996). We conclude by presenting a case example illustrating key assessment and treatment methods.

The Systemic Context of Returning Veterans

We focus on couple and family therapies for returning service members because combat deployment affects not only military personnel, but their families on practical and psychological levels. In addition, National Guard and Reserve component service members, who have been utilized extensively in Iraq and Afghanistan, often experience greater levels of family and occupational disruption during deployments, magnifying the detrimental effects of psychological disorders like depression and posttraumatic stress disorder (PTSD) on interpersonal functioning. Because couple and family relationships can serve as either a vital support or challenging obstacle to recovery from combat-related pathology, therapy targeting the family context can enhance outcomes and reduce the risk of deterioration.

Couple therapy for returning soldiers and their families takes place within the context of combat deployments that may be prolonged and repeated. It is important for clinicians to be aware of the potential stresses that such deployments place on not only soldiers, but also their partners and overall family systems. Although most families endure deployment challenges successfully (Karney & Crown, 2007), there is evidence that the experience of combat deployment poses a substantial challenge to family systems (Gimbel & Booth, 1994). The deployment experience lasts much longer than simply a service member's time away from home because significant effort is required by service members and their families to prepare for and recover from deployment. Partners must prepare to rely on alternative sources of social support and, if there are children, prepare for one parent to raise them as a single parent. Additional psychological burdens are imposed by virtue of the reality that military families must actively prepare not only for separation, but also for the possibility that the service member may be severely injured or killed. Due to the high current operational tempo, the recovery period from a deployment may be attenuated because of the need to prepare for yet another deployment.

Both partners are likely to worry about the safety and well-being of family members and about the strength of the relational bond in the face of the separation. Ironically, although communication between soldiers and partners during deployment is greater in Afghanistan and Iraq than any previous war, these communications do not always allay stress, such as when service members share their fears in "real time," or family members share bad news from home.

During the reunion period following deployment, soldiers and partners must reconstruct their relationship as both have inevitably changed during the deployment in response to coping with prolonged periods of stress and uncertainty. Some partners will feel that they were tested and strengthened by their experiences; others

may feel overwhelmed and isolated. As partners get to know one other again, they must renegotiate how to communicate with one another, make decisions together, divide up tasks and assign roles within the family, deal with finances, raise children, and once again rely upon one another.

As difficult as this transition may be, it can be complicated by disruptions in the soldiers' postdeployment mental health. Although it is important not to underestimate the resilience of soldiers, partners, and families to the stresses of combat and deployment (Bonanno, 2004), extant evidence suggests that returning soldiers report substantial rates of mental health concerns including PTSD, depression, anxiety, and substance abuse (Hoge et al., 2004). A recent population-based survey found that rates of these mental health problems as well as interpersonal conflicts were significantly higher among National Guard/Reserve soldiers compared to active components soldiers following their return from Iraq (Milliken, Auchterloine, & Hoge, 2007). Concerns about interpersonal conflicts increased at least fourfold among National Guard/Reserve soldiers during the 6 months following their deployment.

There is unequivocal evidence of the robust association between mental disorders and marital distress (e.g., Jacobson, Holtzworth-Munroe & Schmalings, 1989; Whisman, Uebelacker, & Bruce, 2006). Numerous studies have also demonstrated that veterans suffering from PTSD are more likely to report lower couple satisfaction, be divorced or be considering divorce, engage in intimate partner violence, and report difficulties with childrearing (Galovski & Lyons, 2004).

In this context, it is not surprising that requests for treatment for relationship distress are among the most common in mental health agencies providing care for military service members (Department of Defense Task Force on Mental Health, 2007). In addition to alleviating conflict in relationships and enhancing social support by partners, couple therapy may also facilitate returning service members' coping with traumatic events. Indeed, greater social support has been identified as one of the strongest correlates of lower rates of PTSD, a finding that is particularly robust for combat trauma (Brewin, Andrews, & Valentine, 2000). Postdeployment factors such as negative social interactions, negative life events, and psychosocial stressors such as divorce can substantially erode social support and increase the risk of PTSD (Brewin et al., 2000). Posttraumatic stress disorder symptoms have also been shown to predict deteriorating social support over time, underscoring the disorder's corrosive impacts on social functioning and family members (Guay, Billette, & Marchand, 2006). Thus, interventions targeting couple relationships can both ameliorate relationship distress and facilitate recovery. In the remainder of this article, we describe and illustrate couple therapy for returning soldiers and their partners using PTSD as an exemplar.

Avoidance and Relationships in Combat-Related Posttraumatic Stress Disorder

We ground our conceptualization and treatment of PTSD in a relational context based on experiential avoidance. Experiential avoidance occurs when individuals engage in efforts to alter the frequency or experience of distressing internal events, such as thoughts, feelings, memories, or bodily sensations (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). This includes cardinal symptoms of PTSD, such as avoiding external and internal trauma reminders, as well as a wide range of problem behaviors that function to reduce distressing internal experiences associated with the trauma (Polusny & Follette, 1995). Other examples include social withdrawal,

substance use, and dissociation. Avoidance impedes emotional processing of traumatic events and hinders exposure to experiences that challenge erroneous associations between trauma reminders and fear or anxiety. In this way, avoidance plays a role in the development and maintenance of PTSD symptoms (Foa & Rothbaum, 1998). Chronic, pervasive experiential avoidance has also been shown to lead to increased distress and impairment in individual functioning over time (Marx & Sloan, 2005).

Experiential avoidance is likely to alter interpersonal processes and tends to exert negative consequences on couple satisfaction and intimacy (Leonard, Follette, & Compton, 2006). Avoidance behaviors, such as distancing from others, emotional numbing, or being excessively involved in productive (e.g., work) or nonproductive (e.g., video games) activities to cope with trauma-related symptoms, are thought to be particularly harmful to relationship functioning. The lack of emotional involvement and expression arising from such behaviors may reduce opportunities for closeness and intimacy, validation, and effective communication. It is not surprising, therefore, that the avoidance cluster of PTSD symptoms contributes to lower couple satisfaction even after controlling for other PTSD symptoms (Galovski & Lyons, 2004).

The hyperarousal symptoms of irritability and anger also detract from couple functioning. Posttraumatic stress disorder has been associated with increased risk for intimate partner violence, and even nonviolent anger and hostility can lead to reduced communication, ineffective problem solving, and decreased social support (Sherman, Zanotti, & Jones, 2005). We conceptualize anger as a form of experiential avoidance when angry outbursts function to increase emotional distance or when anger serves as a “secondary emotion” overlying primary but distressing emotions, such as sorrow or fear.

To summarize, experiential avoidance can lead one to (a) engage in acts that reduce internal discomfort in the short term, but (b) serve to distance a person from their interpersonal relationships (especially couple relationships), and (c) deprive a person from opportunities to confront future discomfort, thereby hindering recovery. Couple therapy provides a useful venue in which to identify and confront experiential avoidance as it affects the relationship and also as it plays out in a soldier's broader life.

Integrative Behavioral Couple Therapy for Posttraumatic Stress Disorder

The development of couple therapy for treating PTSD remains in its infancy. Although several treatments have been proposed (e.g., Johnson, 2002; Leonard et al., 2006; Sherman et al., 2005), only one pilot study on cognitive-behavioral couple therapy (Monson, Schnurr, Stevens, & Guthrie, 2004) and another on adjunctive behavioral family therapy (Glynn et al., 1999) have provided outcome data thus far. The lack of demonstrated efficacy of couple therapy as a primary treatment for PTSD has led to recommendations that currently it be viewed only as an adjunctive intervention (Riggs, 2000).

Integrative behavioral couple therapy, developed by Jacobson and Christensen (1996), was initially designed to improve efficacy and relapse rates associated with traditional behavioral couple therapy (Jacobson & Margolin, 1979). In contrast to the traditional treatment, IBCT includes an emotional acceptance component that is particularly useful for targeting the experiential avoidance endemic to PTSD. Although change strategies continue to be used (e.g., behavior exchange,

communication/problem-solving), the primary emphasis in IBCT is to help partners accept (and even embrace) aspects of each other and their relationship that have come to be viewed as intolerable and insoluble.

From an IBCT framework, acceptance includes letting go of the struggle to change each other, but is not to be confused with resignation or living with unacceptable behavior (e.g., abuse, explosive outbursts, or marked social avoidance). Acceptance in IBCT is a process to help couples to use their differences as a means of enhancing understanding and intimacy instead of driving them apart. Integrative behavioral couple therapy promotes acceptance as a pathway towards problem resolution (when a problem improves as the struggle to eliminate the problem stops) or circumvention (so that the problem no longer prevents intimacy and other valued activities). The balance between acceptance and change strategies characteristic of IBCT serves as an ideal platform to target both the relationship and individual problems faced by couples when a partner has PTSD. Integrative behavioral couple therapy has a strong empirical base, showing efficacy in treating relationship distress (Christensen et al., 2004; Jacobson, Christensen, Prince, Cordova, & Eldridge, 2000).

We conceptualize IBCT for PTSD as operating through several mechanisms. First, it reduces conflict and increases intimacy between a soldier and his or her partner, which, in turn, reduces the individual distress of both. This may, in and of itself, promote recovery from trauma-related symptoms, and at the very least, should reduce stress in a soldier's life and enhance social support. Second, IBCT fosters acceptance, tolerance, and expression of primary emotions such as fear or sadness that often underlie the chronic anger associated with PTSD. Emotions of this kind are often cut off or minimized by soldiers suffering from the disorder. The acceptance fostered through IBCT is seen as the functional opposite of experiential avoidance (Leonard et al., 2006). Third, IBCT is a behavioral approach that includes skills acquisition and generalization strategies to improve communication and problem-solving skills. Finally, IBCT's emphasis on intimacy and increased positive activities (through behavioral exchange) fosters relational exposures that may encourage soldiers to confront situations, feelings, and conversations that they have avoided; an avoidance which ironically maintains PTSD symptoms.

In couple therapy, it is important to distinguish the "broad" exposure we discuss here from traditional trauma-focused exposure work used in individual therapy for PTSD. Individual exposure-based therapy for PTSD makes use of intensive and extended periods of revisiting traumatic memories and associated feelings to reduce the anxiety and arousal and facilitate cognitive processing of the memory (e.g., Foa & Rothbaum, 1998). It may be helpful, on a case-by-case basis, to facilitate disclosure of trauma events within a couple context (Leonard et al., 2006; Sherman et al., 2005); however, we do not advocate systematic exposure work in a couple context. It may not be therapeutic to encourage disclosure of traumatic experiences in couple therapy, particularly combat events in which the soldier was an active participant. Further, the therapist cannot control a partner's (perhaps entirely legitimate) reactions to a soldier's disclosure of traumatic events, and thus may not be able to provide a safe, corrective environment for trauma disclosure. Finally, we are not convinced that formal exposure is required for every soldier suffering from PTSD. When targeting experiential avoidance, exposure work can be quite broad and can include exposure to any stimuli that are avoided, including things such as leaving the house, sharing an intimate moment, or having a difficult conversation. The application of IBCT to enhance exposure involves current life events and relationships, not necessarily past traumatic memories.

We will now highlight salient points of our IBCT adaptation to the military service member population. The intervention is divided into assessment and treatment phases, with the first few sessions (typically 1–2 conjoint and an individual meeting with each partner) making up the assessment phase. The primary focus of this assessment, adapted from Jacobson and Christensen's (1996) original manual, include seven areas:

1. Level of distress
2. Level of commitment to the relationship
3. Conflict areas
4. What makes the conflict a problem
5. The individual and relationship strengths that keep the couple together
6. Deployment-related issues (e.g., how has the couple dealt with the stress of deployment and reintegration; what roles have been altered since deployment)
7. PTSD-related issues (e.g., how PTSD symptoms affect the relationship)

The next session is used as a feedback session to provide couples with information gathered during assessment, including the initial formulation of couple problems. The formulation is a cardinal feature of IBCT and is provided in this early session to begin a dialogue about relationship themes. The formulation attempts to put words to the process or controlling variables that underlie most of the relationship conflicts and individual frustrations, and is intended to help couples join together against a common problem instead of continuing to attempt to change each other in unproductive ways. The formulation also contains basic education about PTSD symptoms and experiential avoidance tailored to the specific presentation of the soldier and the couple. By incorporating this education in an individualized context we attempt to enhance retention and comprehension of the information provided, but also to facilitate acceptance and change of PTSD-related behaviors within the couple.

Like standard IBCT, the content of treatment varies session to session and is focused on emotionally relevant topics. Sessions most often focus on recent interactions that were successful or difficult, differences between partners, how one's behavior affects the other, and planning for upcoming events. Generally, the dominant emphasis in IBCT is to facilitate a collaborative stance characterized by mutual understanding and emotional acceptance between partners. Although the order and relative emphasis of acceptance versus change strategies varies between couples, acceptance interventions are required in the standard IBCT protocol and often dominate treatment.

Treatment adherence and dropout tends to be a problem with younger returning veteran populations, and this has led to the modification of standard IBCT in at least five ways. First, length of treatment is typically shorter than standard IBCT, with most veterans receiving from 12–14 sessions instead of 24–26 sessions. Second, we have also found it useful to incorporate elements of motivational interviewing (Miller & Rollnick, 2002) and values clarification (Hayes, Strosahl, & Wilson, 1999) in early phases of the treatment. By eliciting “change talk,” discussing pros and cons for change, and elaborating core values we try to clarify treatment goals and enhance treatment retention. Third, assessment and feedback sessions with this population always include education about trauma and trauma reactions. Fourth, throughout treatment the identification and blocking of experiential avoidance as it manifests in couple interactions is a primary focus. Fifth, an increased emphasis is placed on behavioral exchange and activity scheduling during treatment to increase

involvement with shared and individual activities. These strategies are incorporated to circumvent experiential avoidance and are tailored in a gradual exposure process to match the unique needs of each couple.

Case Illustration

Presenting Problem

Mike and Kimberly presented for couple therapy 8 months following Mike's return from Iraq where he had been deployed for the previous 15 months. Kimberly initially was concerned that Mike wouldn't stick with treatment and gave him an ultimatum—psychotherapy or separation—before he phoned for the appointment. Mike finally agreed to 12 weeks of couple therapy after “losing his temper” during a recent argument. Kimberly spent several nights at a friend's house and refused to come home unless Mike was willing to get help. Mike was evaluated by an outpatient intake team and diagnosed with PTSD of moderate severity. He was referred for couple therapy after stating that his primary concern and motivation for treatment was his marriage.

Mike and Kimberly, in their mid-twenties, met through mutual friends while attending community college. Mike, the youngest of an intact urban family with four children, had worked fulltime as an electronics technician and had been slowly accumulating college credits when he enlisted in the National Guard. Kimberly, who was an only child, was taking courses, working as a bank teller, and living with her parents to save money. The two “hit it off” right away and seemed to want the same things in life—interesting careers, a nice house, and children. They were dating for nearly 2 years when Mike was notified that he would be deployed to Iraq. He proposed to Kimberly soon after, and they planned a simple wedding 4 months later. Together, they had enough money saved to buy a small home, and Mike was deployed shortly after they were able to move into it. At the time of Mike's deployment, neither Mike nor Kimberly had any history of significant physical or psychological disorders.

Assessment and Feedback

Assessment was conducted over the course of two conjoint sessions and one individual session with each partner. Mike and Kimberly shared a variety of strong emotions during sessions and appeared to be struggling primarily over intimacy and closeness in their marriage. Kimberly tearfully stated that she just wanted “the old” Mike back. She complained that he didn't seem like himself, he never wanted to spend time together, and they didn't talk as much now as they did when he was thousands of miles away. When she expressed her feelings or pressed him, Mike got irritated, said “mean things,” and sometimes looked at her with “hate” in his eyes.

Kimberly said Mike's deployment was hard on her in many ways, but she was able to cope by staying in touch with him and staying busy with school, friends, and work. She couldn't wait for him to come home, and she described the first several weeks as a “perfect” reunion. At first they were together all of the time, they talked into the nights, celebrated with friends and family, and Kimberly had fun showing Mike all of the projects she had completed in their new home.

Once things settled down, Kimberly was back into her routine and Mike was hired as a tech on a new project at his old company. Kimberly began to worry more and more about him over the next several weeks when Mike started to become

increasingly “moody” and “insecure.” He started to complain about his job and seemed to dread going to work. He didn’t want to do anything, wasn’t interested in sex, and wanted to stay home most of the time. Mike played videogames on the computer late into most nights and increased his alcohol intake. Frustrated, Kimberly felt justified in spending time with her friends (a group of similar-aged, mostly single men and women) although she knew that this would displease Mike. Mike’s excessive alcohol use led to increased friction with Kimberly. Ultimately, Mike missed several days of work and was fired from his job—the trigger for the heated argument that brought them to treatment. Kimberly reported that she had tried everything she could to make things right between them: she tried talking with him, giving him space, planning fun things to do, being flirtatious, and everything else she could imagine. When nothing worked she eventually demanded that he get a job and stop acting like a child. Kimberly felt that no matter what she did, Mike just seemed farther away, less interested, more sarcastic.

Mike agreed that he needed to decrease his drinking and work on a career plan, but he saw things differently. He felt that Kimberly wanted too much from him; she wanted to talk “constantly” and usually about petty matters. He was amazed at how much she changed while he was gone, and he privately shared irritation about the friends she made (especially male) and the money she spent on furniture and home decorations while he was deployed. Plus, he felt that she just didn’t seem to understand how “stupid” and unattractive it was to worry about material things—he felt this was trivial in comparison to the state of the world. Mike acknowledged that life was really different in Iraq and that he had seen some “pretty bad stuff.” He endorsed sleep problems, intrusive thoughts, and described himself as detached, tense, and unable to have fun. This was especially true when Kimberly “needled” him to get a job, do a project, or go out with her. Sometimes he just wanted to yell “shut up,” but found that videogames and a few drinks helped. Sometimes, like the night of their big fight, he was actually afraid that he might hit her just to stop her from talking. Mike said that this really shook him up, and he decided then and there that he didn’t want to lose the best thing in his life—thus he agreed to get help. Mike shared feelings of guilt about how often Kimberly was crying, and he started to think that she was right, he was no longer the man she married.

During the feedback session, the therapist presented an initial formulation of the interaction patterns of Mike and Kimberly’s conflict and the role of PTSD in their relationship.

Despite the fact that you’ve lived separate lives over the past year and a half because of Mike’s deployment, I see you both being committed to each other and eager to make things work. The two of you have been through a difficult relationship strain (deployment), and one primary factor that we have to consider is that Mike is experiencing symptoms of posttraumatic stress disorder (PTSD) that are affecting your interactions. The conflict that you are experiencing now centers on Kimberly wanting Mike to resume married life together now that you are home, to be open and available—emotionally, physically, and with your time. She wants you be her partner and to collaborate together to build your home, finances, and family together as you had planned. From Kimberly’s perspective, it’s a bit like the pause button has been lifted and your lives are on “play” again—which makes a lot of sense since Kimberly has been taking care of day to day tasks and waiting for your return. However,

from Mike's perspective, the lives that are "playing" are changed in fundamental ways as a function of his experiences as a soldier in Iraq. The tricky thing is that Mike's experiences have brought PTSD into your lives, and this makes knowing what kind of relationship he wants and needs even more difficult. So both the long separation and the disorder itself make relating to each other difficult. One classic symptom of PTSD is a strong desire to avoid things that are associated with the traumatic events, and oftentimes, the desire to avoid spreads to other areas like avoiding feelings, people, and activities. For you Mike, it seems that when Kimberly asks you to be there for her, you often feel pressured, overwhelmed, and frustrated. You don't really know how to talk about what you are experiencing, you aren't a good actor, and you're fearful that you might hurt Kimberly in some way if you are honest about everything you are thinking and feeling. So instead, you make jokes, get angry, space out on the computer, or drink. Kimberly, you wind up feeling sad, rejected, and unloved—and after some time you started feeling resentful and angry. You fell back on your old coping strategies (those that helped when Mike was in Iraq), and you have been working hard and hanging out with your friends. When this happens, Mike feels insecure about your commitment, guilty, and sad—feelings that make him tend to pull back and withdraw even more. Can you see a vicious cycle in play?

Course of Treatment

In the sessions that followed, Mike and Kimberly were provided with information about PTSD, empirically supported treatments, and the role of avoidance in maintenance of the disorder. Sessions focused on building a collaborative set by labeling the PTSD symptoms and validating the experience of both partners, helping them to unite around the ways PTSD had affected their interactions. Kimberly's anger toward Mike decreased quickly as she better understood what he was going through, and Mike began to talk more about his private experiences. Mike explained that he sometimes felt that he was going "crazy." He hated being in public with Kimberly because he couldn't shake the feeling that he needed to be ready in case something happened—he needed to be on guard, to defend himself and protect her (resulting in distraction, detachment, tension, and frustration). As Mike was increasingly genuine about his experience, Kimberly was less judgmental and communicated more understanding. The couple began to see some of their problems as part of the PTSD that they could treat through exposure. During sessions, Mike and Kimberly were encouraged to slow down and to notice a full range of feelings and thoughts. Outside of sessions, Mike and Kimberly began to do small, but tender things for each other and began to tackle a mutually derived hierarchy of activities together (e.g., having a date during the day, having a date at night, having friends over, going out with friends).

Later sessions focused on difficult interactions that occurred through the week, especially those characterized by anger. Mike and Kimberly slowly began to understand themselves and each other more fully and their mutual efforts helped them to take risks together in session. Several sessions focused on making the private emotions and thoughts associated with anger and frustration more public—starting

to have the real conversations they had been avoiding. Mike eventually shared how worried he was that Kimberly may not have been faithful during his deployment. He knew that other wives had cheated on his friends, and he had a hard time dealing with his sexual feelings during deployment. Kimberly told Mike how good it felt to hear this because she thought he was not attracted to her and didn't love her anymore. She was able to look him in the eyes, hold his hand, and reassure him that she had not and did not want to be with anyone other than him—he continued to be the man that she wanted as her husband. Over the next several weeks, Mike and Kimberly became sexually intimate again and steadily seemed to be more accepting and loving. Mike started to talk about his interests and career goals, and Kimberly was able to listen and be collaborative.

Outcome and Prognosis

By the end of 13 weeks of treatment, Mike and Kimberly both said their relationship was considerably stronger, that they had fewer arguments, and that they were spending considerably more time together. Mike was more open to leaving the house and engaging in social activities, and spent less time on the computer or drinking. He still had some intrusive symptoms of PTSD (particularly some nightmares about his Iraq experiences) and was considering pursuing individual therapy to address these.

Clinical Issues and Summary

The composite case of Mike and Kimberly illustrates the use of acceptance-based couple therapy both in terms of couple interactions (as Mike and Kimberly came to understand and accept changes each had made through the deployment) and individual experiences (as Mike, in particular, had to confront and accept uncomfortable feelings in and outside of sessions). As is often the case, acceptance-based interventions led to some specific change strategies (such as activity scheduling). We have found the application of IBCT to couple distress with PTSD to be valuable. There remains, however, the need for controlled research to assess the efficacy of this and other couple-based treatments for ameliorating couple distress with returning soldiers.

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Prospective Predictors of Resilience in OIF Deployed National Guard Soldiers

Over 1.4 million U.S. troops have served in Iraq (Operation Iraqi Freedom; OIF) and Afghanistan (Operation Enduring Freedom; OEF). While epidemiological data suggests that most returning military personnel will not develop long-term adverse mental health outcomes, combat exposure and other deployment stressors are associated with considerable risks of posttraumatic stress disorder (PTSD), depression, and alcohol abuse. Identification of factors that promote resilience and recovery is critical, yet existing literature is limited by use of retrospective, cross-sectional designs. Recent military operations have increasingly relied on National Guard and Reserve troop deployments. However, little is known about individual factors that influence outcomes among these troops. This symposium highlights initial findings from the Readiness and Resilience in National Guard Soldiers (RINGS) Cohort Study. The RINGS Cohort Study is a prospective, longitudinal investigation of individual, environmental and contextual factors influencing risk and resiliency in a representative sample of 522 National Guard soldiers deployed to OIF. The first presenter will provide an overview of the design and methods used in the RINGS Cohort Study. Next, three presentations will report on initial pre-deployment, in-theater, and post-deployment (in progress, current response rate = 68%) findings with this large cohort study of OIF deployed soldiers. The second presenter will report on a prospective examination of pre-deployment environmental risk factors predicting PTSD symptoms both in-theater (Time 2) and two months post-deployment (Time 2). The third presenter will report on the moderating effects of the PSY-5 Personality scales (Positive and Negative Emotionality) on in-theater distress and further examine this relationship post-deployment. Finally, the fourth presenter will examine the utility and interactions of personality, distress, and environmental factors in predicting alcohol abuse both pre- and post-deployment. Implications of these findings for intervening with returning OIF/OEF military personnel and suggestions for future research will be discussed.

(1) The Readiness and Resilience in National Guard Soldiers Cohort Study

In this presentation, we will provide an overview of design and methods of the Readiness and Resilience in National Guard Soldiers (RINGS) Cohort Study. The RINGS Study is a prospective, 5-wave investigation of the effects of pre-deployment, deployment, and post-deployment risk and resiliency factors on subsequent mental health outcomes, service utilization, and military retention/attrition. In March 2006, we surveyed a representative sample of 522 male and female National Guard soldiers (20% of a National Guard combat brigade) one month prior to their deployment to OIF. Participants completed a battery of reliable and valid instruments that assessed pre-deployment risk factors for post-traumatic adjustment difficulties and baseline mental health. A subset ($n = 230$) completed Wave 2 data collection two months before the end of their deployment while in Iraq. Using a mailed survey methodology, the RINGS Study will collect three additional waves of follow-up data from the entire pre-deployment cohort. Wave 3 data began within 60 days of troops' return from Iraq and is in progress. The current response rate stands at 68% with non-response appearing minimal. Wave 4 (one-year later) and Wave 5 (two-years later) data collection are planned. Additionally, we are currently completing in-person clinical assessments that include structured clinical interviews and psychological testing. As an introduction to the three other presentations in this

symposium that report on initial findings from the RINGS Cohort Study, we provide a description of the instruments and outcome measures used. Longitudinal data collection procedures will also be discussed.

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(2) Prospective Risk/Resilience Factors Predicting In-theater and Post-Deployment PTSD Symptoms

Objective: The mental health of National Guard soldiers returning from combat deployments is a national concern. Our knowledge of risk and resilience factors for combat trauma is derived largely from retrospective, cross-sectional studies of active duty personnel. The present study prospectively examines pre-deployment environmental risk factors predicting symptoms of post-traumatic stress disorder (PTSD) among a cohort of National Guard soldiers deployed to Iraq.

Method: 522 Minnesota National Guard infantry soldiers completed surveys 1 month prior to deploying to Iraq (Time 1; n = 522), during the last 2 months of their deployment (Time 2; n = 230); and 2 months after their return from deployment to Iraq (Time 3; current n = 368). Time 1 and Time 3 measures included key subscales of the Deployment Risk and Resiliency Inventory as well as measures of distress (e.g., the PTSD Checklist; PCL, the Beck Depression Inventory 2; BDI-2) while Time 2 surveys included only the PCL and BDI-2. The sample was predominantly male and Caucasian, with a mean age of 29 year and a rate of marriage/cohabitation of 41%.

Results: Structural equation modeling will be used to evaluate the prospective effects of personal and environmental risk and resilience factors, including pre-deployment symptoms, childhood family environment, prior life stressors, military preparedness, and perceived support, on soldiers' in-theater and post-deployment symptoms of PTSD.

Preliminary analyses suggest that lower perceived military preparedness and increased concern about the impact of deployment on quality of life are significantly associated with later PTSD symptoms.

Conclusion: Current results support the role of perceived preparedness and life disruption in predicting PTSD symptoms during OIF deployment. Expansions of these findings including Time 3 data will be discussed. Follow up longitudinal studies are needed to evaluate the effects of post-deployment factors on the course of adjustment in this population and over time.

(3) Neuroticism and Introversion Moderate Distress in Deployed National Guard Soldiers

Cross sectional research has demonstrated that broad band personality dimensions of positive emotionality (PEM) and negative emotionality (NEM) influence presentation of PTSD in combat exposed Vietnam Veterans (Miller et al., 2003; 2004). The interaction between personality variables and exposure to stressful events can lead to insight into factors that decrease vulnerability to long term emotional consequences of trauma exposure. In the current study, a representative sample of 522 National Guard soldiers were administered a number of self report instruments including shortened versions of the MMPI-2 PSY-5 scales, the BDI-II and the PCL one month prior to their deployment to OIF. A subset (n = 230) of these soldiers were also administered the BDI-II and the PCL two months before the end of their deployment while in Iraq. Zero order correlations

between PSY-5 Neuroticism/Negative Emotionality and the BDI-II and PCL were significant and substantial when assessed at baseline ($r=.63$ and $.61$). To identify a moderating effect of personality, standard least square multiple regressions were conducted entering pre-deployment score on the PCL or BDI-II, followed by Neuroticism or Introversion and an interaction term. Initial scores on the BDI-II and PCL entered the equation and accounted for a significant amount of the variance in self-reported distress. Introversion did not contribute a moderating effect for either the BDI-II or the PCL. A significant moderating effect for Neuroticism was observed on the BDI-II. Time 2 BDI-II scores obtained in Iraq of individuals in the middle and low range of Neuroticism were better accounted for by Neuroticism than the pre-deployment BDI-II. Although a moderating effect of personality on self-reported distress was only partially supported, a more robust relationship may be observed after soldiers have returned from deployment and are no longer exposed to the stressful in-theater environment. This possibility will be examined further with Time 3 data.

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(4) Alcohol Use in National Guard Soldiers Pre- and Post-Deployment

Extensive alcohol use is a significant problem for many military service personnel. Research has suggested that the number of individuals who misuse alcohol is greater than the number of individuals who experience depression, anxiety, or Posttraumatic Stress Disorder (PTSD), both before and after combat deployments (Hoge, Castro, Messer, McGurk, Cotting, & Koffman, 2004). Factors such as mental health (including PTSD and depression) and personality have been found to be strongly associated with problematic alcohol use (e.g., Miller, 2003; Stewart, 1996). Environmental factors, such as significant stressors, insufficient social support, and social and family disruption are also associated with alcohol problems. Cross-sectional studies, while informative, are unable to examine the predictive utility of these variables in relation to alcohol use and, further, cannot examine the long-term implications of extreme alcohol use on functioning following a combat deployment. The present study utilizes a two-wave longitudinal design including Time 1 data gathered prior to a combat deployment for a group of 522 National Guard soldiers and Time 2 data gathered three months after their return from Iraq. Analyses will examine the utility and interactions of personality, mental health problems (PTSD and depression), and environmental factors (including perceived support and mission preparedness) in predicting problematic Time 2 drinking. Secondary analyses will examine the importance of Time 1 drinking in predicting mental health outcomes following deployment when controlling for other Time 1 covariates.

We expect that measures of environmental stress and support will account for variance in problematic drinking behaviors both before and after deployment, above and beyond factors that have historically been associated with problematic drinking, including demographic information, psychological distress (such as symptoms of depression and PTSD), and personality factors. We thus hope to offer important insights into risk factors for a potentially devastating problem in a high risk population.

Prospective Predictors of Resilience in OIF Deployed National Guard Soldiers

Melissa A. Polusny, PhD
Paul Arbisi, PhD ABPP
Co-Chairs

Minneapolis VA Medical Center and
University of Minnesota Medical School

The Readiness and Resilience in National Guard Soldiers Cohort Study



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Maureen Murdoch, MD MPH
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Overview

- Background
- Goals of the RINGS Cohort Study
- Study Design
- Data Collection Procedures
- Measures
- Participants
- Preliminary Findings

Background

- 1.6 million U.S. troops deployed to OEF/OIF
- 46% National Guard/Reservists
- High levels of combat exposure
- Elevated risk for mental health disruptions



Background

- Most common reaction to combat is *resilience*
- Majority of OEF/OIF veterans will *not* experience long term psychological difficulties (Hoge et al., 2006)
- Data on risk and resilience factors for combat trauma is limited
 - Retrospective
 - Cross-sectional studies
 - Based on active duty personnel

Goals of the RINGS Cohort Study



To identify pre-deployment factors predictive of subsequent:

- Mental health disruptions
- Health care utilization
- Military retention and attrition

in a cohort of NG soldiers

Goals of the RINGS Cohort Study



To identify *pre-deployment* factors predictive of subsequent:

- *Mental health disruptions*
- Health care utilization
- Military retention and attrition

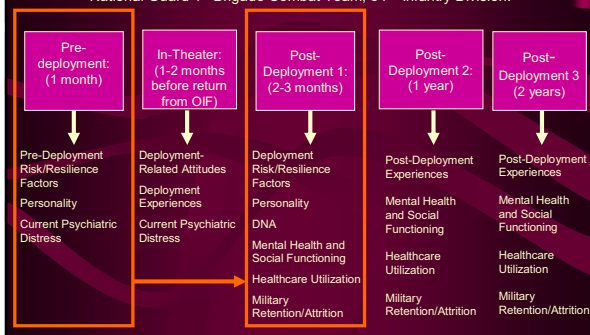
in a cohort of NG soldiers

Readiness and Resilience in National Guard Soldiers (RINGS) Cohort Study

- Soldiers from the 1st Brigade Combat Team, 34th Infantry Division of the MN ARNG (1/34 BCT)
- Mobilized in Sept 2005 – 6 months training at Camp Shelby
- Deployed March 2006 to June-July 2007 – extended 4 months in Iraq
- Total deployment = 22 months

RINGS Cohort Study Design

Collaborative, prospective, longitudinal study of soldiers from the Minnesota Army National Guard 1st Brigade Combat Team, 34th Infantry Division.



Pre-Deployment Data Collection



- 522 Army National Guard soldiers were surveyed one month prior to deploying to Iraq
- Surveys were administered by investigators in a classroom setting

In-Theater Data Collection

- Subgroup of pre-deployment participants completed an in-theater survey
- In-theater data collected in collaboration with the 1/34 BCT's Warrior Transition Program

Post-Deployment 1 Data Collection

- 2-3 months following return from deployment
- Standard mail survey methodology using Minneapolis modification of the Dillman protocol
- Response rate = 81%
- Longitudinal cohort tracking and retention methods

Dependent Measures

Wave of Longitudinal Data Collection		1	2	3
Mental Health Outcomes	• PTSD Checklist (PCL)	X	X	X
	• Depression (BDI-II)	X	X	X
	• Somatic Complaints (PHQ)	X		X
Alcohol Use	• Frequency	X		X
	• Quantity	X		X
	• Frequency of Binge Drinking	X		X
	• Total Drinking	X		X

Risk and Resilience Measures

Wave of Longitudinal Data Collection		1	2	3
Deployment Risk and Resilience Inventory (DRRI; King et al., 2003)	• Prior Stressors	X		
	• Childhood Family Environment	X		
	• Military Preparedness	X		X
	• Unit Support	X		X
	• Concerns about Life/Family Disruptions	X		X
	• Deployment Stressors			
	• Combat Experiences			X
	• Other War-Zone Experiences			X
	• Deployment Concerns			X
	• Deployment Environment			X
	• Post-deployment Support			X
	• Post-deployment Stressors			X

Risk and Resilience Measures

Wave of Longitudinal Data Collection		1	2	3
Personality (MMPI-2 RF)	Personality Factors			
	• Neuroticism/Negative Emotionality	X		X
	• Introversion/Low Positive Emotionality	X		X
	• Disconstraint	X		X

An abbreviated form of the MMPI-2 RF was administered at Pre-deployment, full scales of the MMPI-2 RF were administered at Post-deployment 1

Participants

Demographics at Pre-Deployment	Post-Deployment 1 Responders n = 424	Post-Deployment 1 Non-Responders n = 98
Gender (% Male)	87.7%	91.8%
Mean Age (SD)	29.9 (8.8)	25.5 (6.6)**
% Married	69.4%	51.2%**
Race (% Caucasian)	92.7 %	87.8%
Rank (% Enlisted)	88.9 %	96.2%

Participants

Mental Health Functioning at Pre-Deployment	Post-Deployment 1 Responders n = 424	Post-Deployment 1 Non-Responders n = 98
Pre-Deployment PCL	26.0 (9.8)	26.9 (11.1)
Pre-Deployment BDI-II	6.1 (6.8)	5.8 (6.9)
Pre-Deployment % Weekly Binge Drinking	22.2%	33.7%

Participants

DRRI Subscales at Pre-deployment	Post-Deployment 1 Responders n = 424	Post-Deployment 1 Non-Responders n = 98
Childhood Family Environment	53.4 (10.4)	53.3 (9.2)
Prior Stressors	5.6 (3.3)	5.5 (3.1)
Military Preparedness	34.2 (7.4)	35.1 (7.1)
Unit Social Support	40.5 (10.0)	41.3 (9.4)
Concern for Life/Family Disruptions	29.0 (7.4)	28.0 (7.9)

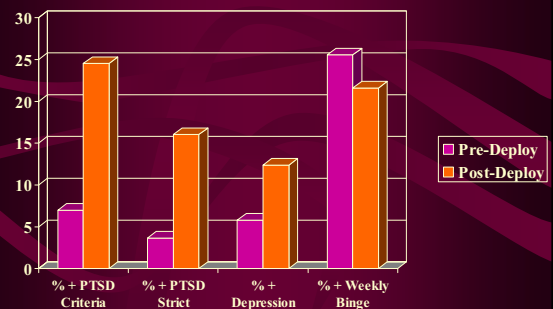
Participants

MMPI-2 Psy-5 Scales at Pre-Deployment	Post-Deployment 1 Responders n = 424	Post-Deployment 1 Non-Responders n = 98
Negative Emotionality	5.5 (4.1)	5.4 (4.1)
Introversion	5.9 (2.8)	5.2 (3.0)*
Disconstraint	8.3 (2.6)	9.0 (2.6)*

Pre- and Post-Deployment Mental Health Functioning

Variable	Pre-Deployment	Post-Deployment 1
PCL Total Score	26.20 (10.01)	35.61 (13.94)***
BDI-II Total Score	6.03 (6.81)	9.68 (8.19)***

% Soldiers Screening for Mental Health Concerns Pre- and Post-Deployment



Our Presenters

- **Chris Erbes** – Contextual/environmental predictors of post-deployment PTSD and depressive symptoms
- **Paul Arbisi** – Moderating effects of the Psy-5 Personality scales on the impact of combat exposure on post-deployment distress
- **Amanda Ferrier-Auerbach** – Role of personality, distress, and environmental factors in predicting post-deployment binge drinking

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Contextual Predictors of Post-Deployment Symptoms in the RINGS Cohort



Christopher R. Erbes
Paul A. Arbisi
Madhavi Reddy
CPT Cora Courage

Melissa A. Polusny
Paul Thuras
COL Michael Rath

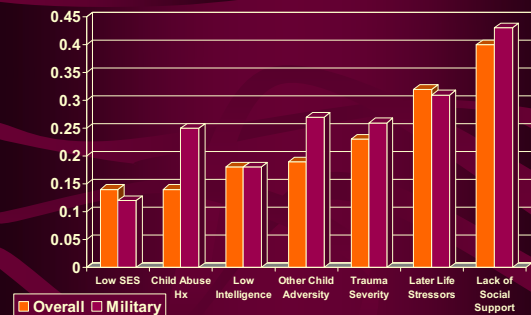
Outline

- Why study contextual factors?
- Study design (measures and time points)
- Results:
 - Predictors of PTSD symptoms
 - Predictors of Depression symptoms
- Discussion

Why Study Contextual Factors?

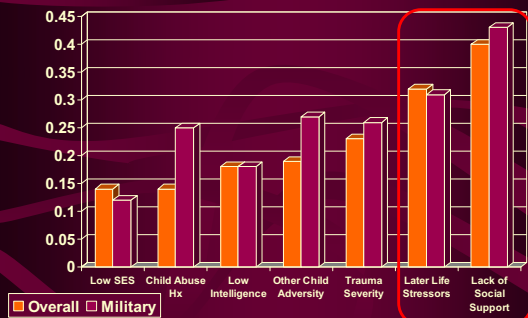
- Large effect sizes
- Inform theory development
- Potentially modifiable!

Risk factors for PTSD



Adapted from Brewin et al., 2000

Risk factors for PTSD



Limitations of Existing Literature

- Variables measured retrospectively
- Variables measured in isolation
- Variables measured cross-sectionally

Variables: Demographics and Outcome

Time Point		Pre-Deploy	Post-Deploy 1
Mental Health Outcomes	• PTSD Checklist (PCL)	X	X
	• Depression (BDI-II)	X	X
Demographics	• Age	X	
	• Gender	X	
	• Rank (Enlisted Yes / No)	X	

Variables: Contextual Predictors

Time Point		Pre-Deploy	Post-Deploy 1
Pre-Deployment Factors	• Prior Stressors	X	
	• Childhood Family Environment	X	
	• Preparedness	X	X
	• Deployment Social Support (Unit Support)	X	X
	• Concerns about Life/Family Disruptions	X	X
During Deployment Factors	• Combat Exposure		X
	• Perceived Threat		X
	• Aftermath of Battle		X
	• Difficult Living/Working Environment		X
Post-Deployment Factors	• Postdeployment Social Support		X
	• Postdeployment Stressors		X

Analysis Strategy

- OLS Regression
 - Dependent Variables: PTSD, Depression
 - Independent Variables
 - Block 1: Pre-deployment Factors
 - Assessed pre-deployment
 - Block 2: During and Post-deployment Factors
 - Assessed post-deployment
 - Block 2 variables residualized on pre-deployment variables
- Missing data handled with listwise deletion
 - 91% (N = 388) had complete data on all variables

Results: PTSD

- Step 1 (pre-deployment variables)
 - $\Delta R^2 = .24^{***}$
- Step 2 (post and during deployment variables)
 - $\Delta R^2 = .24^{***}$
- Final Model
 - Adjusted $R^2 = .45^{***}$

PTSD: Final Model

	Significant Predictors	sr ²
Pre-Deploy	PTSD (Pre-Deployment)	.09
	Concerns for Family/Life Disruption	.02
	Deployment (Unit) Support	.01
	Preparedness	-.02
	Prior Stressors	.07
	Gender (female)	.02
	Age	-.01
Post-Deploy	Concerns for Life/Family Disruption	.01
	Combat Exposure	.04
	PostDeployment Social Support	-.16

Results: Depression

- Step 1 (pre-deployment variables)
 - $\Delta R^2 = .25^{***}$
- Step 2 (post and during deployment variables)
 - $\Delta R^2 = .19^{***}$
- Final Model
 - Adjusted $R^2 = .42^{***}$

Depression: Final Model

	Significant Predictors	sr ²
Pre-Deploy	Pre-Deployment Depression	.08
	Concerns for Family/Life Disruption	.03
	Preparedness	-.02
	Prior Stressors	.08
	Gender (female)	.01
Post-Deploy	Deployment (Unit) Social Support	-.02
	Post-Deployment Social Support	-.12
	Post-Deployment Stressors	.03

Results: Summary

- Contextual predictors of PTSD:
 - Worries about family, job, life disruption, *before* deployment and *during* deployment
 - A sense of not being *prepared* by or *supported* in the military
 - Post-deployment *Social Support*
- Contextual predictors of Depression:
 - Worries about family, job, life disruption *before* deployment
 - A sense of not being *prepared* or *supported* in the military
 - Post-deployment *Social Support*
 - Post-deployment *Life Stressors*

Implications: Family Concerns

- Negative impact on both PTSD and Depressive symptoms
- Possible depletion of resources
 - Increased demands upon the soldier during/after deployment
 - Decreased available support for soldier from home during/after deployment
- Possible interventions?

Implications: Military Preparedness and Support

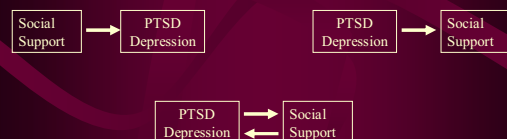
- Preparedness and Unit Support predictive of both PTSD and Depression
- Sense of cohesion with other soldiers as a protective factor?
- Sense of preparedness = efficacy? (buffer vs. negative affect)
- Possible interventions?

Implications: Post-Deployment Stressors

- Predictor of Depressive symptoms
- Possible depletion of resources
 - Marital disruptions/divorce
 - Job loss or stressors
 - Financial difficulties
- We may be able to do things to help with this.

Implications: Post-deployment Support

- Strong correlate of both PTSD and Depression
- Cross-sectional finding!
- Direction of causality:



Future Directions

- Current RINGS Data Set and Project
 - Future waves of longitudinal data (Post-Deployment 2 and Post-Deployment 3)
 - Consideration of additional predictors and outcomes
 - Simultaneous modeling of interrelationships between predictors and outcomes across time

Future Directions

- In General:
 - Greater specificity of assessment to help target interventions
 - Development and testing of interventions to address contextual factors
 - Development and testing of explanatory models for observed relationships

Thank you for your attention

Neuroticism and Introversion Moderate Distress in Deployed National Guard Soldiers

Paul A. Arbisi, PhD

Paul Thuras, PhD

Madhavi K. Reddy, MA

Christopher R. Erbes, PhD

Melissa A. Polusny, PhD

Introduction

- Miller et al. (2003) suggested that three broad-band personality traits (Negative Emotionality (NEM), Positive Emotionality (PEM) and Constraint/Inhibition (CON)) were responsible for lending increased risk for the development of PTSD and predisposing individuals toward developing either an internalizing or an externalizing form of PTSD.
- Individuals high on NEM were at increased risk for development of PTSD after trauma exposure whereas the interaction between NEM, PEM, and CON influenced the form of PTSD:
 - Internalizing
 - Low PEM
 - Anxiety and Depression
 - Externalizing
 - Low CON
 - Impulsivity, aggression, substance abuse

Introduction

- In subsequent cross sectional studies Miller and colleagues found support for the mediating roles of PEM and CON in the development of internalizing and externalizing forms of PTSD (Miller et al., 2004).
- Further Miller et al. (2006) found that the association between PTSD and substance related problems was fully mediated by CON and NEM with no direct path between PTSD and substance related problems.

Introduction

- In the current study, using a longitudinal design, we examine the role of personality in the development of distress/PTSD symptoms in National Guard Soldiers after exposure to stressful events during deployment to Iraq.
- Consistent with Miller's cross sectional design, we hypothesize that those who score high on NEM after experiencing combat will report higher levels of distress within six months of their return from deployment even after accounting for pre deployment level of distress.

Method

- Participants
 - 522 National Guard Soldiers were administered a variety of self-report measures including, PCL, BDI-II, and shortened forms of the MMPI-2 PSY-5 Scales (Harkness, McNulty, & Ben-Porath, 1995) one month prior to deployment to Iraq
 - 424 National Guard Soldiers were administered the DRR1 Combat Experiences Scale and PCL between two and three months of return to the United States

MMPI-2 PSY-5 Scales

- PSY-5 Aggressiveness
 - Instrumental Aggression
- PSY-5 Psychoticism
 - Disconnection from reality e.g., unshared beliefs, unusual sensory and perceptual experiences
- PSY-5 Disconstraint (CON reversed)
 - High → Risk taking and impulsive
 - Low → Greater self control, rule follower
- PSY-5 Negative Emotionality/Neuroticism (NEM)
 - Prone to worry, self-criticism, guilt and catastrophize
- PSY-5 Introversion/Low Positive Emotionality (PEM reversed)
 - High → Introverted, anhedonic, joyless
 - Low → Extraverted, energized, pleasure seeking

PSY-5 Scales: Reliability

Scales	Items	Short	α^1	α^2	α^3
AGGR	18	11	.57	.67	.72
PSYC	25	19	.66	.69	.78
DISC	29	16	.57	.65	.72
NEGE	33	23	.82	.84	.87
INTR	34	21	.63	.74	.84

¹ Shortened Scales National Guard sample

² Normative sample

³ Clinical Samples

N= 416

Analyses

- Zero order correlations between pre-deployment PCL and PSY-5 scales
- Zero order correlations between post-deployment PCL and pre-deployment PSY-5 scales
- Separate standard least square multiple regression entering pre-deployment score on the centered PCL followed by centered PSY-5 scale, an interaction term and the combat experiences scale score

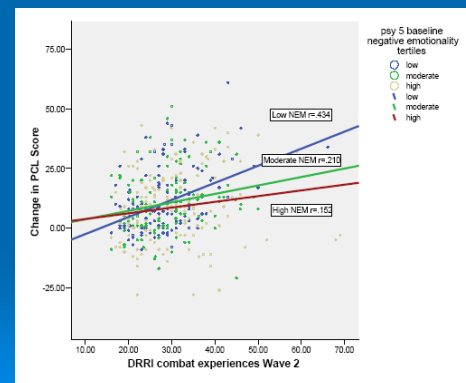
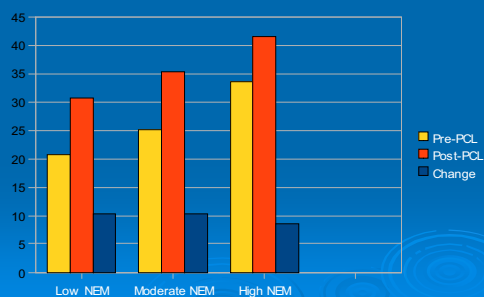
Correlates Between PSY-5 and Pre- and Post-Deployment Measures

	Pre-PCL	Post-PCL
AGGR	0.27**	.31**
PSYC	0.57**	.17**
DISC	0.08	.16**
NEGE	0.61**	.36**
INTR	0.25**	.06

Prediction of Post-Deployment PCL

	Beta	Sig
Pre PCL	.25	.000
NEM	.16	.000
Combat Exp	.33	.000
NEM X Combat Exp	-.10	.03

Exploring the Interaction



Prediction of Post-Deployment 1 PCL

	Beta	Sig
Pre PCL	.33	.000
INTR	.00	ns
Combat Exp	.32	.000
INTR X Combat Exp	-.07	ns

Conclusions

- After accounting for pre-deployment level of distress, findings support direct influence of NEM on increased emotional distress and through an interaction with combat experiences.
- Surprisingly, with PEM there is no direct effect on PCL, although there is a trend toward an interaction.

Conclusions Interactions

- Interaction between pre-deployment NEM and combat is complicated.
 - When divided into tertiles based on NEM, those lower on NEM at pre-deployment show the greatest impact of combat alone on post-deployment distress whereas those at higher levels of NEM show less of an independent effect of combat experiences on post deployment distress.
- Importantly, there was no difference in absolute change in distress across the three levels of NEM.

Future Directions

- SEM to identify mediating and moderating personality factors in development of CAPS defined PTSD
- Determine if pre-deployment personality factors NEM, DISC, PEM predict Externalizing/Internalizing forms of PTSD
- Implications of Personality on Treatment outcome with PTSD
 - Treatment matching?

Alcohol Use in National Guard Soldiers Pre- and Post-Deployment



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Overview of Presentation

- Alcohol use in the military
- Factors involved in alcohol use
- Study hypotheses
- Study method
- Results
- Implications and limitations of study

Alcohol Use in the Military

- Part of military culture
- May increase prior to deployment
 - May be way to cope with emotions
 - High rates of drinking (Hoge, 2004)
 - 17% of Army soldiers drank more than intended
 - 13% felt they needed to cut down pre-deployment

Factors Involved in Alcohol Use

- Demographics
- Personality
- Mental Health
- Environmental Factors

Demographics and Alcohol Use

- Ethnocultural group
- Gender
- Age

Personality and Alcohol Use

- 3- and 5-factor models:
 - Negative emotionality/neuroticism (NEM)
 - Related to greater risk of relapse
 - Disconstraint
 - Combination of NEM and disconstraint related to substance use

PTSD and Alcohol Use

- 73% of veterans with PTSD met criteria for lifetime alcohol abuse/dependence (Kulka et al, 1990)
- Most research: PTSD causes alcohol use, but relationship may be bi-directional
- People with PTSD and high personality disconstraint most at risk for drinking (Miller et al.)

Environmental Factors and Alcohol Use

- Environmental factors related to alcohol use (e.g., peer, familial factors)
- Not yet studied in the military
- Deployment Risk and Resilience Inventory (DRRI) used to study environmental factors in military (King et al., 2006)

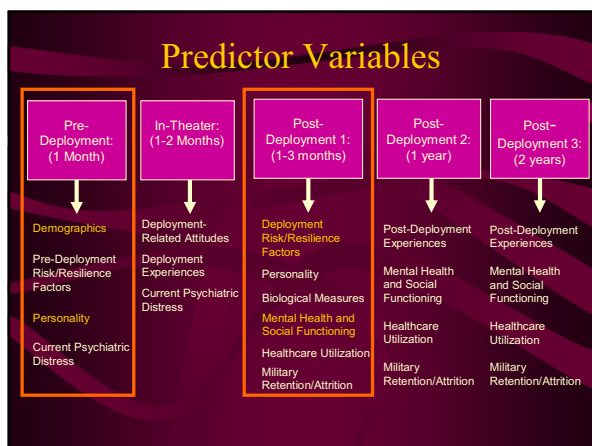
Need for Our Study

- Relative contributions of these risk factors for drinking are understudied
 - Demographics
 - Personality
 - PTSD
 - Environment
- Goals of study:
 - To understand factors predicting long-term alcohol use

Study Hypotheses

- The following variables would predict increases in problematic drinking after deployment:
 - Being younger, male, and White
 - Higher levels of NEM and disconstraint
 - Environmental variables reflecting stress
 - Higher levels of post-deployment PTSD

Predictor Variables



Criterion Variable

- Frequency of post-deployment binge drinking
- Binge defined as 6 or more drinks in one drinking episode.

Analytic Strategy

- 4-step stepwise OLS regression
 - Step 1: Demographic variables
 - Step 2: Personality variables
 - Step 3: Environmental variables
 - Step 4: PTSD symptoms
- Missing data handled with listwise deletion. 372 of 424 soldiers provided complete data

Results of Post-Deployment Binge Drinking

Zero-order Correlations

Predictor Variables	Post-Deployment 1 Binge Frequency
Age	-.14**
Gender	-.07
White	.01
MMPI –2 Disconstraint	.18**
MMPI –2 Negative Emotionality	.21**
MMPI –2 Introversion	.10*
PCL (Post-deployment)	.21**
DRRI Post-deployment Support	-.09*
DRRI Combat Experiences	.18**

** $p < .01$; * $p < .05$

Zero-order Correlations

Predictor Variables	Post-Deployment 1 Binge Frequency
DRRI Aftermath of Battle	.16**
DRRI Perceived Threat	.07
DRRI General Harassment	.05
DRRI Sexual Harassment	-.03
DRRI Deployment Environment	.18**
DRRI Post-deployment Stressors	.10*
DRRI Concern Life/Family Disruption	-.04
DRRI Deployment Social Support	-.03
DRRI Preparedness	-.15**

** $p < .01$; * $p < .05$

Results: Stepwise OLS Regression for Binge Frequency

- Step 1: Demographics [R^2 change = .03*]
 - Significant predictors: Age
- Step 2: Personality [R^2 change = .05**]
 - Significant predictors: Disconstraint, NEM
- Step 3: Environmental Variables [R^2 change = .04, ns]
 - No Step 3 variables emerged as significant
- Step 4: PTSD Symptoms [R^2 change = .02*]
 - Significant predictors: PTSD symptoms

** $p < .01$; * $p < .05$

Final Model

Final Model: Significant predictors

Predictor Variables	β	partial r^2
Personality Disconstraint	.11†	.01
DRRI Concern for Life/Family Disruption	-.12*	.01
DRRI Preparedness	-.11†	.01
PTSD Symptoms	.18*	.02

* $p < .05$; † $p < .10$

Summary of Results

- Frequency of binge drinking predicted by:
 - Higher levels of PTSD symptoms
 - Lower levels of concern for life/family disruption
- Trends for binge drinking to be predicted by:
 - Higher levels of disinhibition
 - Lower levels of preparedness

Influence of Personality

- Strong zero-order relationships between binge drinking and personality variables
- Even after controlling for pre-deployment personality, post-deployment PTSD predicts binge drinking

Clinical Implications

- Some risk factors cannot be changed as easily:
 - E.g., personality
- Some risk factors for drinking can be targeted:
 - E.g., PTSD symptoms
- Comorbidity requires different treatment
 - Need to assess for, treat both PTSD and alcohol abuse

Limitations

- Overlap between constructs
- Preliminary analyses; more sophisticated models (e.g., SEM) would be useful
- Self-report measures
- Problems with external validity
 - Mostly White, NG sample

Conclusion

- Problematic drinking in the military may confer risk of later mental health problems
- Knowledge of certain risk factors may help prevent or decrease consequences of problematic drinking
- This study provided prospective look at risk factors of alcohol use

Prospective Predictors of Mental Health Risk and Resilience in OIF Deployment National Guard Soldiers: Initial Post-Deployment Findings

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Combat exposure and other deployment stressors are associated with considerable risks of PTSD, depression, and alcohol abuse. Understanding factors that increase risk and promote resilience is critical, yet existing literature is limited by retrospective, cross-sectional designs, and has focused on active duty personnel. Little is known about individual factors that influence outcomes among National Guard soldiers deployed to OEF/OIF. The Readiness and Resilience in National Guard Soldiers (RINGS) Cohort Study is a prospective, 4-wave investigation of the effects of pre-deployment, deployment, and post-deployment risk and resiliency factors on subsequent mental health outcomes, service utilization, and military retention/attrition. In March 2006 (one month prior to deployment to OIF), a representative sample of 531 male and female National Guard soldiers completed a battery of reliable and valid instruments that assessed pre-deployment risk factors and baseline mental health. Using a mailed survey methodology, we are collecting three additional waves of follow-up data from this cohort. In this presentation, we will present findings from the initial post-deployment assessment (current response rate stands at 76% with non-response appearing minimal). Prospective pre-deployment predictors of initial post-deployment psychological and social functioning will be examined. Implications of these findings for intervening with returning military personnel will be discussed.

Mental Health Risk and Resilience in OIF Deployed National Guard Soldiers: Prospective Predictors



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Continuing Medical Education Commercial Disclosure Requirement

I, Melissa Polusny, have no commercial relationships to disclose.



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- Minneapolis VA Medical Center

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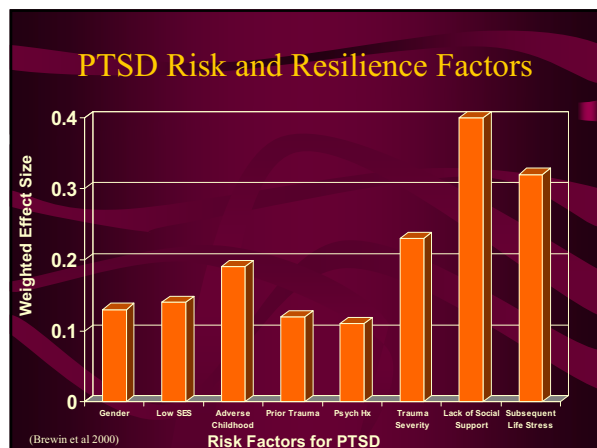
Background

- 1.64 million U.S. troops deployed to OEF/OIF
- High levels of combat exposure
- Elevated risk for mental health disruptions



Resilience is the Most Common Reaction to Trauma Exposure

- Bonnano (2004) on resilience
 - “Most trauma exposed individuals show transient perturbations in normal functioning but generally exhibit a *stable trajectory of healthy functioning across time*.”
- Majority of OEF/OIF veterans will *not* experience long term psychological difficulties
- Importance of identifying factors that predict risk and resilience



Is Personality a Pre-Disposing Risk Factor for the Development of PTSD?

- *Cross-sectional* studies suggest three broad-band personality traits are associated with the development of PTSD (Miller et al., 2003, 2004)
 - Negative Emotionality (NEM)
 - Positive Emotionality (PEM)
 - Constraint/Inhibition (CON)
- Individuals high on NEM are at increased risk for PTSD after trauma exposure, PEM and CON influence form of PTSD
 - High NEM, Low PEM → Internalizing (anxiety and depression)
 - High NEM, Low CON → Externalizing (impulsivity, aggression, substance abuse)

Goals of the RINGS Cohort Study



To identify *pre-deployment, deployment, and post-deployment* factors predictive of subsequent:

- *Mental health disruptions*
- Health care utilization
- Military retention and attrition in two cohorts of NG soldiers

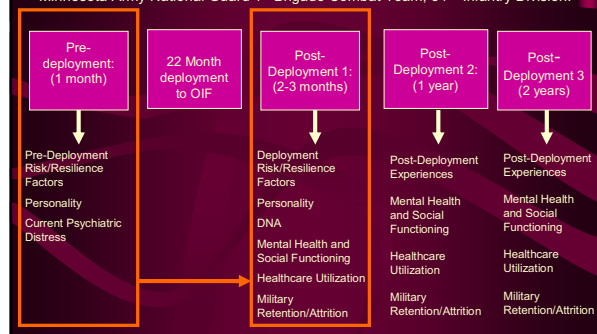
Hypotheses

After controlling for pre-deployment levels of PTSD, post-deployment PTSD symptoms (PCL) will be predicted by:

- NEM
- Pre-deployment risk and resilience factors
- Deployment related risk and resilience factors
- Post-deployment risk and resilience factors

RINGS Cohort Study Design

Collaborative, prospective, longitudinal study of a cohort of 522 soldiers from the Minnesota Army National Guard 1st Brigade Combat Team, 34th Infantry Division.



Pre-Deployment Data Collection



- 522 Army National Guard soldiers were surveyed one month prior to deploying to Iraq
- Surveys were administered by investigators in a classroom setting

Post-Deployment Data Collection

- 2-3 months following return from deployment
- Standard mail survey methodology using Minneapolis modification of the Dillman protocol
- Response rate = 81%

Self Report Measures

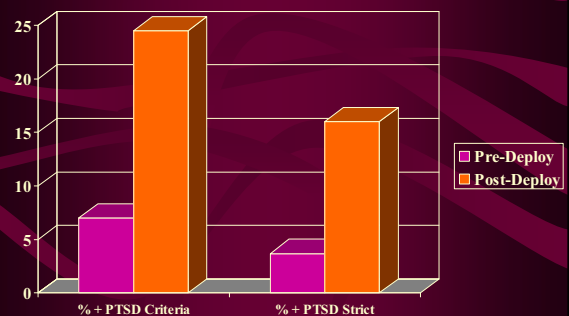
- PTSD Checklist (PCL)
- Demographics (Age, Gender, Rank)
- MMPI-2 PSY 5 (NEM, PEM, CON)
- Any physical injury during deployment
- Deployment Risk and Resilience Inventory (DRRI)

Pre-Deployment DRRI Scales	Post-Deployment DRRI Scales
• Childhood Family Environment	• Combat Exposure
• Prior Stressors	• Perceived Threat
• Preparedness	• Aftermath of Battle
• Unit Support	• Post-Deployment Social Support
• Concerns about Life/Family Disruptions	• Post-Deployment Stressors

Participants

Demographics at Pre-Deployment	Post-Deployment Responders n = 424	Post-Deployment Non-Responders n = 98
Gender (% Male)	87.7%	91.8%
Mean Age (SD)	29.9 (8.8)	25.5 (6.6)**
% Married	69.4%	51.2%**
Race (% Caucasian)	92.7 %	87.8%
Rank (% Enlisted)	88.9 %	96.2%

% Soldiers Screening for PTSD Pre- and Post-Deployment



Predicting Post-Deployment PTSD from Pre- and Post-Deployment Risk and Resilience Factors

- Analysis: Hierarchical OLS Regression
 - Dependent Variable: PTSD Symptoms (PCL)
 - Independent Variables
 - Block 1: Pre-deployment PCL
 - Block 2: Pre-deployment Personality
 - MMPI-2 PSY 5 NEM, PEM, CON scales
 - Block 3: Pre-deployment Risk and Resilience Factors
 - Demographics (Gender, Age, Rank)
 - DRRI scales (Childhood Family Environment, Prior Stressors, Preparedness, Concerns about Family/Life Disruption)
 - Block 4: Deployment Stressors
 - DRRI scales (Combat Experiences, Aftermath of Battle, Perceived Threat)
 - Any injury sustained during deployment
 - Block 5: Post-deployment Risk and Resilience Factors
 - DRRI scales (Post-Deployment Social Support and Life Stressors)

Hierarchical Linear Regression Model: Predictors of Post-Deployment PTSD

Pre-Deployment Predictors	Beta
Step 1: Pre-Deployment PTSD Symptoms	.38***
Step 2: Pre-Deployment Personality	
Negative Emotionality (NEM)	.18**
Positive Emotionality (PEM)	.08
Constraint (CON)	-.04

Hierarchical Linear Regression Model: Predictors of Post-Deployment PTSD

<i>Pre-Deployment Predictors</i>	Beta
Step 3: Pre-deployment Risk/Resilience Factors	
Gender	.11*
Age	<i>ns</i>
Rank	<i>ns</i>
DRRI: Childhood Family Environment	<i>ns</i>
DRRI: Prior Stressors	.19***
DRRI: Preparedness	-.14**
DRRI: Unit Social Support	<i>ns</i>
DRRI: Concerns for Family/Life Disruption	.10*

Hierarchical Linear Regression Model: Predictors of Post-Deployment PTSD

<i>Deployment Predictors</i>	Beta
Step 4: Deployment Stressors	
DRRI: Combat Experiences	.33***
DRRI: Aftermath of Battle	.12*
DRRI: Perceived Threat	.17***
Any injury sustained during deployment	<i>ns</i>

Hierarchical Linear Regression Model: Predictors of Post-Deployment PTSD

<i>Post-Deployment Predictors</i>	Beta
Step 5: Post-Deployment Factors	
DRRI: Post-Deployment Support	.36***
DRRI: Post-Deployment Life Stressors	<i>ns</i>

Final Model Summary

Significant Predictors of PTSD	Beta
Pre-Deployment PTSD Symptoms	.14**
Negative Emotionality (NEM)	.10*
Gender	.13**
DRRI: Combat Exposure	.21***
DRRI: Aftermath of Battle	.13**
DRR: Post-Deployment Support	.36***

Conclusions

- After controlling for levels of pre-deployment PTSD, NEM prospectively predicts (directly) post-deployment PTSD
 - Consistent with Miller's work, PEM and CON were not directly associated with PTSD, but may play moderating or mediating role to be examined in future analyses
- Prior trauma exposure, preparedness and concerns about life/family disruptions assessed at pre-deployment predict post-deployment PTSD, however, these factors are no longer significant after post-deployment factors are included in the model
- Female gender, exposure to combat related stressors during deployment, and less social support *following* deployment predict PTSD

Limitations and Future Directions

- Reliance on self-report measures – analyses of clinical interview data collected at Wave 2 are underway
- Wave 2 predictors are cross-sectional – Wave 3 data collection is in progress with Wave 4 planned
- Future analyses will utilize Structural Equation Modeling
 - Accounts for measurement error
 - Examine mediators and moderators



Questions?
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Dyadic adjustment and PTSD symptoms among OIF veterans: Symptom clusters and pre to post-deployment functioning

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Objectives: The existing literature documenting associations between PTSD and relationship distress is frequently cross-sectional and lacking nuanced investigation of how PTSD and relationship functioning interact over time. Some aspects of relationship functioning may serve as buffers against PTSD, while PTSD symptoms also negatively affect relationship functioning. The present investigation examines relations between soldier and family functioning from pre to post-deployment and correlations between PTSD and relationship satisfaction.

Methods: Participants included 301 married or cohabitating soldiers from the Readiness and Resilience in National Guard Soldiers (RINGS) study. They completed self-report measures 1 month prior to deployment to Iraq and 2-3 months after their return. Self-report instruments included demographics and measures of PTSD symptoms (PCL), relationship adjustment (DAS), depression (BDI-II), alcohol use, and concerns about family functioning.

Results: Longitudinal relationships. Hierarchical multiple linear regression analyses with Time 2 PTSD as the dependent variable found that time 1 ratings of concern over life and family disruption significantly and independently predicted Time 2 (post-deployment) symptoms of PTSD when controlling for other covariates. Additional analyses of time 1 predictors of Time 2 DAS scores will also be presented. Cross-sectional relationships. Significant, moderate negative correlations were found between Time 2 dyadic adjustment and each of the clusters of PTSD symptoms from the PCL. However, when allowed to compete for variance in a multiple regression, only numbing symptoms displayed a unique relationship with dyadic adjustment (re-experiencing, $b = .20, p = .082$; trauma-specific avoidance, $b = -.10, p = .648$, general numbing, $b = -.53, p < .001$, arousal, $b = -.19, p = .063$).

Conclusions: The present investigation suggests concern of disruption to soldiers' lives and families may predict PTSD symptoms and that numbing symptoms may provide a point for intervention due to their unique association with relationship adjustment above and beyond other PTSD symptom clusters.

Impact Statement: Findings highlight the importance of developing a more precise understanding of how PTSD symptoms and family distress are related for the development of interventions addressing these co-occurring problems and the prediction of PTSD symptoms over time.

Dyadic adjustment and PTSD symptoms among OIF veterans:

Symptom clusters and pre to post-deployment functioning

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PTSD & Couple Distress

- Emotional numbing
 - Strongly tied to emotional closeness and intimacy
 - Linked to relationship satisfaction above and beyond other symptom clusters
- Hyperarousal
 - Anger and irritability associated with
 - IPV, psychological abuse, reduced relationship intimacy, and impaired social support
 - Promoting tension and stress
 - Impairing problem solving ability
 - Limiting ability to engage in inhibitory or self-monitoring processes

Limitations of Existing Literature

- Frequently cross-sectional
- Lack data on pre-deployment functioning
- Conducted with veterans with chronic PTSD (e.g., Vietnam, WWII)
- Lack of inclusion of variables beyond PTSD
 - Role of other pre and post-deployment factors

Study Objectives

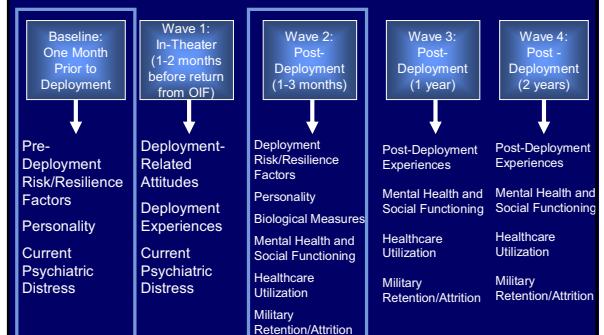
1. Prospective examination of longitudinal associations between PTSD and post-deployment dyadic adjustment
 1. Including other relevant pre-deployment and post-deployment variables
 2. Sample of OIF veterans
2. Post-deployment associations between PTSD symptom clusters and dyadic adjustment

Participants:

Readiness and Resilience in National Guard Soldiers (RINGS) Cohort Study

- Deployed to OIF March 2006 to June-July 2007
 - 22 months (Extended 4 months in Iraq)
- 300 soldiers in relationships
 - 94% White/Caucasian
 - 40% some college; 46% college or advanced degree
 - 62% employed; 15% students
 - Length of relationship
 - 32% up to 2 years
 - 68% 3 or more years

RINGS Cohort Study Design



Analysis Strategy

- **Objective 1: Longitudinal Predictors**
 - Correlations
 - OLS Regression
 - Dependent Variables: DAS-7
 - Independent Variables:
 - **Block 1:** Demographics and Pre-deployment Factors
 - **Block 2:** During and Post-deployment Factors
- **Objective 2: PTSD Symptom Clusters**
 - Correlations
 - OLS Regression

Predictors of Dyadic Adjustment Assessed Prior to Deployment

Demo- graphics	<ul style="list-style-type: none"> ◦ Age ◦ Gender ◦ Rank (<i>Enlisted Yes / No</i>)
Pre- Deploy Factors	<ul style="list-style-type: none"> ◦ Negative Childhood Family Environment (<i>DRRI</i>) ◦ Concern for Family Disruption (<i>DRRI</i>) ◦ Unit Social Support (<i>DRRI</i>) ◦ PTSD Checklist (<i>PCL</i>) ◦ Depression (<i>BDI-II</i>) ◦ Alcohol use (<i>Quantity/Frequency</i>)

Predictors of Dyadic Adjustment Assessed Following Deployment

During Deploy Factors	<ul style="list-style-type: none"> ◦ Combat Exposure (<i>DRRI</i>) ◦ Perceived Threat (<i>DRRI</i>) ◦ Aftermath of Battle (<i>DRRI</i>)
Post- Deploy Factors	<ul style="list-style-type: none"> ◦ Social Support (<i>DRRI</i>) ◦ PTSD Checklist (<i>PCL</i>) ◦ Depression (<i>BDI-II</i>) ◦ Alcohol use (<i>Quantity/Frequency</i>)

Predicting Dyadic Adjustment: Correlations

Demo	<ul style="list-style-type: none"> ◦ Age ◦ Gender ◦ Rank (Enlisted Yes / No)
Pre- Deploy Factors	<ul style="list-style-type: none"> ◦ Negative Childhood Family Environment ◦ Concern for Family Disruption ◦ Unit Social Support ◦ PTSD Checklist (PCL) ◦ Depression (BDI-II) ◦ Alcohol use
During Deploy Factors	<ul style="list-style-type: none"> ◦ Combat Exposure ◦ Perceived Threat ◦ Aftermath of Battle
Post- Deploy Factors	<ul style="list-style-type: none"> ◦ Social Support ◦ PTSD Checklist (PCL) ◦ Depression (BDI-II) ◦ Alcohol use

Predicting Dyadic Adjustment: Correlations

Demo	<ul style="list-style-type: none"> ◦ Age ◦ Gender ◦ Rank (Enlisted Yes / No) 	<i>r</i>	-.11*
Pre- Deploy Factors	<ul style="list-style-type: none"> ◦ Negative Childhood Family Environment ◦ Concern for Family Disruption ◦ Unit Social Support ◦ PTSD Checklist (PCL) ◦ Depression (BDI-II) ◦ Alcohol use 		.18** -.24*** .087 -.14** -.17** -.04
During Deploy Factors	<ul style="list-style-type: none"> ◦ Combat Exposure ◦ Perceived Threat ◦ Aftermath of Battle 		.06 -.04 .00
Post- Deploy Factors	<ul style="list-style-type: none"> ◦ Social Support ◦ PTSD Checklist (PCL) ◦ Depression (BDI-II) ◦ Alcohol use 		.11* -.31*** -.32*** -.07

Dyadic Adjustment: Pre-deployment Predictors

Demo	<ul style="list-style-type: none"> ◦ Age ◦ Gender ◦ Rank (Enlisted Yes / No) 	$\beta = .13^*$
Pre- Deploy Factors	<ul style="list-style-type: none"> ◦ Negative Childhood Family Environment ◦ Concern for Family Disruption ◦ Unit Social Support ◦ PTSD Checklist (PCL) ◦ Depression (BDI-II) ◦ Alcohol use 	$\beta = -.14^*$ $\beta = .22^{**}$
During Deploy Factors	<ul style="list-style-type: none"> ◦ Combat Exposure ◦ Perceived Threat ◦ Aftermath of Battle 	
Post- Deploy Factors	<ul style="list-style-type: none"> ◦ Social Support ◦ PTSD Checklist (PCL) ◦ Depression (BDI-II) ◦ Alcohol use 	

Dyadic Adjustment: Final Model		
Demo	oAge	$\beta = -.12^\dagger$
	oGender	
	oRank (Enlisted Yes / No)	
Pre-Deploy Factors	oNegative Childhood Family Environment	$\beta = .13^*$
	oConcern for Family Disruption	
	oUnit Social Support	$\beta = -.18^{**}$
	oPTSD Checklist (PCL)	
	oDepression (BDI-II)	
	oAlcohol use	
During Deploy Factors	oCombat Exposure	
	oPerceived Threat	
	oAftermath of Battle	
Post-Deploy Factors	oSocial Support	$\beta = -.24^*$
	oPTSD Checklist (PCL)	
	oDepression (BDI-II)	
	oAlcohol use	

Post Deployment PTSD Symptom Clusters and Relationship Functioning						
		REEXP	AVOID	NUMB	AROUS	TOT
DAS-7	r	-.17**	-.24***	-.36***	-.30***	-.32***
DAS-7	β	.20*	-.07	-.33***	-.16 [†]	

Summary	
o	After controlling for pre-deployment variables, including PTSD symptom severity
1.	Negative childhood family environment
2.	Concern for family disruption before deployment
3.	Post-deployment PTSD symptom severity
o	PTSD symptom clusters with unique associations with dyadic adjustment:
•	Re-experiencing
•	Numbing

Conclusions	
o	Pre-deployment concerns of family disruption as a marker for post-deployment relationship adjustment
o	Severity of PTSD symptoms after deployment remain a robust correlate even after controlling for pre-deployment PTSD and other relevant variables
o	Role of numbing symptoms in relationship adjustment
•	Decrease positive engagement, intimacy, and increase emotional withdrawal

RINGS Research Team	
o Principal Investigators	o Project Coordinator
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• Christopher Erbes, PhD	
o Co-Investigators	o Postdoctoral Fellows
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Determinants of Early Mental Health Treatment Seeking Among a Cohort of Iraq War National Guard Soldiers

Since 2001, over 1.6 million troops have been deployed to the wars in Afghanistan (Operation Enduring Freedom; OEF) and Iraq (Operation Iraqi Freedom; OIF). Following combat deployments, up to 35% of National Guard soldiers may have mental health problems (Miliken, Auchterlonie, & Hoge, 2007). Posttraumatic stress disorder (PTSD) is one of the most commonly occurring mental health conditions, with recent estimates suggesting that 24% of National Guard soldiers returning from Iraq may meet diagnostic criteria for PTSD six months post-deployment (Miliken et al., 2007). Despite being eligible for VA mental health care for 5-years following deployment, less than one-half of OEF/OIF soldiers with mental health disorders have sought treatment (Hoge et al., 2004). As the number of OEF/OIF veterans with mental health needs grows, it will be essential to identify the facilitators and barriers of mental health treatment seeking. The goal of the current project is to identify determinants of mental health treatment seeking for PTSD among a cohort of OIF National Guard Soldiers. Participants will be 381 National Guard soldiers who returned from a 16-month combat tour in Iraq in July 2007. The data was collected as part of a larger, prospective, 4-wave investigation of the effects of pre-deployment, deployment, and post-deployment risk and resiliency factors on subsequent mental health outcomes, service utilization, and military retention/attrition. As part of the second wave of data collection conducted 3-9 months after the soldiers' return from Iraq, 73% of the larger sample completed a mailed self-report survey questionnaire assessing a variety of in-theater and post-deployment factors. Using the behavioral service utilization framework developed by Anderson (Anderson, 1995; Anderson & Bartkus, 1973), we will use structural equation modeling to examine the relationships between predisposing factors, enabling factors, need for services, and mental health service utilization. The predisposing factors that will be examined are sociodemographic characteristics (age, education, gender, ethnicity, marital status) and war zone stressors (including combat exposure). The enabling factors will include in-theater use of mental health services and psychiatric medications, in-theater social-support, post-deployment life stressors and social support, perceived stigma of mental health treatment seeking, pre-deployment mental health utilization, and attitudes towards mental health treatment. The need-based factors will be self-reported level of PTSD symptomology (as measured by the Posttraumatic Checklist), self-reported level of depressive symptomology (as measured by the Beck Depression Inventory – II), and exposure to traumatic brain injury (TBI). The primary outcome variable will be self-reported mental health service utilization (both VA and non-VA) within the first 3-9 months post-deployment. We will discuss the Implications of the results and how they can inform efforts to facilitate treatment seeking among OEF/OIF veterans.

Kehle, S. M., Polusny, M. A., Erbes, C., Arbisi, P. A., Thuras, P., Reddy, M.K., & Murdoch, M. (2009, November). *Determinants of early mental health treatment seeking among a cohort of Iraq War National Guard Soldiers*. Poster presented at the annual meeting of the Association for Behavioral and Cognitive Therapies, Orlando, FL.

Determinants of Early Mental Health Treatment Seeking Among a Cohort of Iraq War National Guard Soldiers

Shannon M. Kehle^{1,2,3}, Melissa A. Polusny^{1,2,3}, Christopher Erbes^{2,3}, Paul A. Arbisi^{2,3}, Paul Thuras^{2,3}, Madhavi K. Reddy^{2,3}, & Maureen Murdoch^{1,2,3}

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Purpose

Since 2001, over 1.6 million troops have been deployed to the wars in Afghanistan (Operation Enduring Freedom; OEF) and Iraq (Operation Iraqi Freedom; OIF). Following combat deployments, up to 35% of National Guard soldiers may have mental health (MH) problems (Miliken et al., 2007). Posttraumatic stress disorder (PTSD) is one of the most commonly occurring MH conditions, with recent estimates suggesting that up to 24% of National Guard soldiers returning from OIF may meet diagnostic criteria for PTSD six months post-deployment (Miliken et al., 2007). Despite being eligible for VA mental health care for 5-years following deployment, less than one-half of OEF/OIF soldiers with MH disorders have sought treatment (Hoge et al., 2004). As the number of OEF/OIF veterans with MH needs grows, it will be essential to identify the facilitators and barriers of MH treatment seeking.

Previous research regarding service utilization for PTSD has found that need factors (e.g. symptom level and psychiatric diagnoses) are the strongest predictors of treatment seeking (Elhai et al., 2005; Maguen et al., 2007). Other consistent predictors have been age, gender, marital status, income, insurance coverage, and comorbid physical health problems (Elhai et al., 2005; Maguen et al., 2007; van der Velden et al., 2007). Among combat veterans, both combat exposure and previous trauma have also been found to increase the likelihood of seeking treatment, both directly and indirectly through need variables (Maguen et al., 2007). Finally, distrust of mental health professionals and stigma regarding treatment seeking are negatively associated with service utilization (Elhai et al., 2005; Stecker et al., 2007).

To date, much of the research regarding PTSD treatment seeking has focused exclusively on demographic and access variables. The objective of this project was to examine the impact of psychosocial and attitudinal variables on MH treatment seeking of OIF National Guard Soldiers.

Methods

• Participants were a cohort of 423 National Guard soldiers who returned from a 16-month combat tour in Iraq in July 2007

• Data used for the current analyses were collected via self-report survey questionnaires that were administered approximately one-month prior to deployment to OIF and 3-6 months post-deployment. The surveys were administered in person pre-deployment and were mailed to participants at post-deployment

• Self-reported use of VA and non-VA psychotherapy services since return from OIF was the primary outcome measure

• Psychotherapy services included individual therapy, group therapy, couple therapy, or chemical dependency treatments. Use of psychiatric medication and psychiatric case management were also assessed. Rates of medication use are reported, but predictors of medication use were not examined

• Predictor variables included:

➢ Post-deployment PTSD symptoms, as measured by the PTSD Checklist (PCL; Blanchard et al., 1996)

➢ Post-deployment depression, as measured by the Beck Depression Inventory – 2 (BDI-II; Beck et al., 1996)

➢ Post-deployment stressors, post-deployment social support, combat experiences, and perceived threat while deployed as measured by subscales of the Deployment Risk and Resilience Inventory (DRRI; King et al., 2003).

➢ Attitudes regarding MH treatment and MH professionals (Fisher & Turner, 1970)

➢ Perceived stigma regarding MH problems (Britt et al., 2000)

➢ Single items assessing gender, overall health, perceived current MH, interest in seeking MH treatment, injury in theater, residence

Table 1: Univariate predictors of post-deployment mental health counseling (N = 423)

Variable	OR	Lower 95% CI	Upper 95% CI	p
Gender	0.45	0.21	0.97	.040
Perceived Health	0.58	0.37	0.9	.015
Injury in Country	2.36	1.46	3.83	.001
Combat Experiences	1.27	1.03	1.56	.023
Perceived Threat	1.24	1.00	1.54	.050
Current MH Problem				
Probably	1.18	0.68	2.03	.560
Yes	2.75	1.67	4.53	.001
Interest in MH Treatment				
Probably	1.65	0.97	2.79	.490
Yes	4.47	2.48	8.07	.001
PTSD Symptoms (PCL)	1.53	1.24	1.89	.001
Depression Symptoms (BDI)	1.42	1.15	1.75	.001
Previous Psychotherapy	1.66	1.01	2.74	.047
In Theater Psychiatric Meds	1.17	0.74	1.87	.450
In Theater Psychotherapy	1.95	0.89	4.22	.090
Poor Satisfaction with In Theater MH Treatment	0.93	0.75	1.16	.530
Post-deployment Stressors	1.34	1.09	1.65	.005
Poor Post-deployment Social Support	1.1	0.88	1.35	.400
Positive Attitudes Toward MH Treatment	0.81	0.65	1.01	.060
Lack of Stigma Regarding MH Treatment	1.89	1.00	3.59	.049

Table 2: Competitive logistic regression model of predictors of post-deployment mental health counseling (N = 423)

Variable	B	SE B	Wald	OR
Gender (Female)	-0.98**	0.42	5.29	0.38
Injured or Wounded in Iraq	0.83**	0.27	9.47	2.29
Interest in MH Treatment				
Probably	0.33	0.30	1.26	1.40
Yes	1.32**	0.34	14.86	3.76
Post-deployment PCL	0.26*	0.13	4.05	1.30

* $p < .05$; ** $p < .01$

Results

• Sample characteristics: 87.8% were male; 94.7% were Caucasian; 85% had some college; 88% were enlisted soldiers; 50.8% were married, mean age was 29.9 (8.8) years

• 34.6% of respondents reported that they had received any mental health services since returning from Iraq. 23% of the soldiers received counseling, 4.4% received medications, and 7.3% received both counseling and medications

• Among soldiers who screened positive for PTSD, 49.2% had received treatment. Of those who screened positive for depression, 60% had received treatment

• We conducted a series of univariate logistical regression examining the impact of each variable on post-deployment MH counseling (see Table 1). Univariate predictors that were not significant were not included in the competitive model

• We then tested a competitive logistic regression model (see Table 2). The results of the logistic regression showed that the overall model was significant, $\chi^2(5, N = 423) = 47.25, p < .001$

• The significant independent predictors were post-deployment PTSD symptomatology, interest in MH treatment, female gender, and an in theater injury

• Post-deployment BDI, post-deployment life stressors, combat experiences, prior MH counseling, and post-deployment social support were not retained

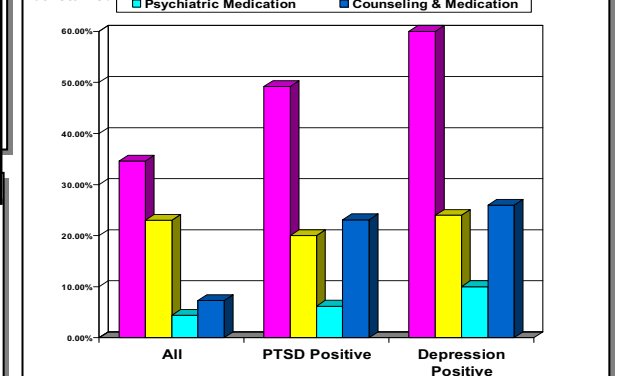


Figure 1: Percent of Iraq War soldiers receiving mental health treatment 3 – 6 months post-deployment

Conclusions

• Approximately one-third of the soldiers were receiving MH treatment

• Fewer than one-half of soldiers who screened positive for PTSD were receiving treatment

• The strongest predictor of receiving psychotherapy was current interest. As in other studies, need (PTSD symptoms) emerged as a strong predictor.

• Injury was a strong predictor, may provide initial VA contact

• Unlike community studies, women were less likely to receive treatment



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Rates and Predictors of Mental Health Treatment Seeking among Iraq War National Guard Soldiers

Objectives: The goal of the current project was to identify rates and psychosocial determinants of mental health treatment seeking for PTSD among a cohort of OIF National Guard Soldiers.

Methods: Participants were a cohort of 423 National Guard soldiers who returned from a 16-month combat tour in Iraq in July 2007. Data used for the current analyses were collected via mailed self-report survey questionnaires that were administered approximately one-month prior to deployment to OIF and 3-6 months post-deployment. Self-reported use of psychiatric medications and mental health counseling were the primary outcome measures. Using the behavioral service utilization framework (Anderson, 1995; Anderson and Bartkus, 1973), predisposing (e.g. personality characteristics, pre-deployment mental health, combat experiences), enabling (e.g. stigma, attitudes regarding mental health treatment, in-theater use of mental health services, social support), and need (both perceived and observed symptoms of PTSD and depression) psychosocial factors were examined as determinants of mental health treatment seeking.

Results: 34.6% of respondents reported that they had received any mental health services since returning from Iraq. 23% of the soldiers received counseling, 4.4% received medications, and 7.3% received both counseling and medications. Among soldiers who screened positive for PTSD, 49.2% had received treatment. Of those who screened positive for depression, 60% had received treatment. Preliminary correlational analyses suggested that post-deployment levels of both depression and PTSD were related to treatment seeking, as were attitudes regarding mental health treatment, post-deployment life stressors, in-theater injury, in-theater blast exposure, and combat exposure. Satisfaction with in-theater mental health support combat aftermath experiences were uniquely related to medication treatment seeking. Following these preliminary analyses, we plan to use structural equation modeling (SEM) to examine the relationships between factors related to mental health treatment seeking.

Implications: Approximately one-third of OIF National Guard soldiers had received mental health treatment in the first 3-6 months after returning from Iraq. Preliminary analyses suggested that increased symptoms of depression and PTSD and in-theater injury were the factors most strongly related to treatment seeking.

Impacts: This study provides initial information regarding psychosocial barriers and facilitators of mental health treatment seeking among OIF National Guard soldiers.

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Rates and Predictors of Mental Health Treatment Seeking Among Iraq War National Guard Soldiers

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Purpose

All OEF/OIF veterans, including those activated from the National Guard (NG), are eligible for free VA health care for 5 years following deployment. Early data suggest that approximately 40% of eligible OEF/OIF veterans have sought physical and mental health (MH) treatment at VA medical facilities (VHA, 2008). Although these data suggest that substantial proportions of OEF/OIF returnees are using their VA health care benefits, concerns remain that many OEF/OIF troops, particularly those with mental health problems, may not be seeking needed treatment. For example, Hoge and his colleagues reported fewer than one-half of troops who screened positive for PTSD, depression, or generalized anxiety were receiving needed mental health care (Hoge et al., 2004).

The first goal of the current study was to examine rates of mental health treatment seeking among a panel of OIF NG soldiers three- to six-months post-deployment. Rates were examined for the sample as a whole, as well as for soldiers who screened positive for either depression or PTSD. The second goal was to examine facilitators and barriers of early mental health treatment seeking. We focused primarily on in-theater and post-deployment psychosocial and attitudinal factors. These factors have been relatively understudied, yet they may be important because they are modifiable (unlike demographics or trauma characteristics) and thus, may be more amenable to interventions designed to encourage treatment-seeking.

Methods

*Participants were a panel of 424 National Guard soldiers who returned from a 16-month combat tour in Iraq in July 2007.

*Data were collected using self-report mailed surveys mailed approximately 2-3 months after the soldiers' return from OIF. Surveys and a \$50 incentive were mailed to those who had agreed before their deployment to be contacted for future research (response rate = 81.2%).

*The primary outcome measures, self-reported use of post-deployment VA and non-VA psychotherapy and psychopharmacology, were assessed using a series of dichotomous items (yes vs. no). Psychotherapy services included individual therapy, group therapy, couple / family therapy, and chemical dependency treatments.

*Predictor variables included:

➢ A composite need variable that consisted of post-deployment PTSD symptoms, as measured by the PTSD Checklist (PCL; Blanchard et al., 1996), post-deployment depression, as measured by the Beck Depression Inventory – 2 (BDI-II; Beck et al., 1996), and two single items assessing perceived current MH and interest in receiving MH treatment.

➢ Post-deployment stressors, post-deployment social support, combat experiences, and perceived threat while deployed as measured by subscales of the Deployment Risk and Resilience Inventory (DRRI; King et al., 2003).

➢ Thoughts and beliefs about seeking mental health services (Attitudes Towards Seeking Professional Psychological Help Scale; Fischer & Turner, 1970).

➢ Perceived barriers and stigma regarding MH problems as assessed by 13 items designed for use in military samples (Britt, 2000; Hoge et al., 2004) and three additional items developed for the current study. A principal component analysis of the 16 items revealed four individual factors: "barriers to care", "self stigma", "others stigma", and "MH treatment doesn't work".

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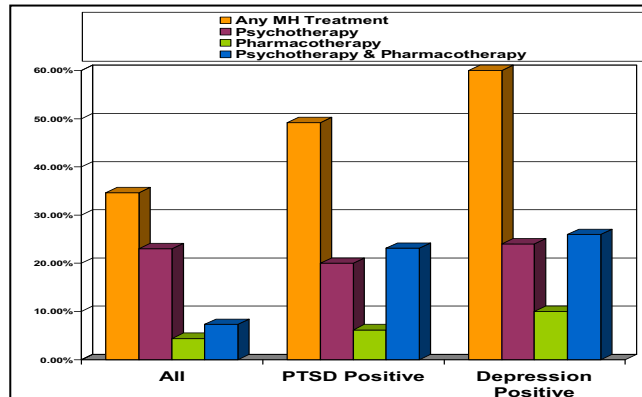


Figure 1: Percent of Iraq War soldiers receiving mental health treatment 3 – 6 months post-deployment

Table 1: Univariate predictors of post-deployment psychotherapy and psychopharmacology (N = 424)

Variable	Psychotherapy		Psychopharmacology	
	OR	95% CI	OR	95% CI
Gender (female)	0.45*	0.21 - 0.96	1.22	0.52 - 2.88
Pre-Deployment MH Service Use	1.71*	1.04 - 2.81	1.86	0.96 - 3.60
Injury In-Theater	2.42*	1.49 - 3.91	5.20**	2.79 - 9.68
Combat Experiences	1.28*	1.04 - 1.57	1.62**	1.24 - 2.12
Perceived Threat	1.25*	1.01 - 1.55	1.12	0.88 - 1.63
Poorer Health	1.75*	1.13 - 2.72	2.78**	1.47 - 5.25
Need Factor Score	1.72**	1.38 - 2.13	2.28**	1.69 - 3.08
Meds In-Theater	1.16	0.73 - 1.84	3.15**	1.71 - 5.78
Psychotherapy In-Theater	3.29**	1.86 - 5.82	3.84**	1.95 - 7.58
Poor Satisfaction with In-Theater MH Services	0.96	0.84 - 1.09	1.16	0.98 - 1.38
Post-Deployment Stressors	1.37**	1.12 - 1.68	1.69**	1.31 - 2.16
Post-Deployment Social Support	1.12	0.91 - 1.38	1.45*	1.09 - 1.94
Positive Attitudes about MH Treatment	1.39**	1.11 - 1.73	1.21	0.89 - 1.65
MH Treatment Stigma	0.94	0.76 - 1.15	1.00	0.74 - 1.35
Self Stigma	0.99	0.81 - 1.23	1.17	0.87 - 1.57
Barriers	1.09	0.88 - 1.35	1.01	0.75 - 1.37
MH Doesn't Work	0.78*	0.63 - 0.98	0.68*	0.49 - 0.93
Other Stigma	0.88	0.71 - 1.09	1.01	0.75 - 1.36

*p < .05; **p < .01

Results

•Sample characteristics: 87.5% were male; 94.7% were Caucasian; 62% had some college; 88% were enlisted soldiers; 50.8% were married, mean age was 31.91 (8.78) years

•Approximately one-third of respondents reported that they had received any mental health services since returning from Iraq (see Figure 1).

•15.6% of the sample screened positive for PTSD. Soldiers who screened positive for PTSD were more likely to receive psychotherapy (43.9% vs. 27.1%; $\chi^2(1) = 7.49, p = .006$) or medications (30.0% vs. 8.1%; $\chi^2(1) = 26.32, p < .001$) than soldiers who did not screen positive.

•11.8% ($n = 50$) of soldiers screened positive for depression. Those who screened positive were more likely to receive psychotherapy (50.0% vs. 28.1%; $\chi^2(1) = 9.84, p = .002$) or medications (36.0% vs. 8.6%; $\chi^2(1) = 31.30, p < .001$) than those who did not screen positive.

•We conducted a series of univariate logistical regressions examining the impact of each variable on post-deployment psychotherapy and psychopharmacology (see Table 1). Univariate predictors that were not significant were not included in the competitive models.

•The competitive model predicting psychotherapy was a good fit for the data; the Hosmer-and-Lemeshow fit statistic was $\chi^2(8, N = 424) = 8.02, p = .43$ (see Table 2). Post-deployment life stressors, combat experiences, perceived threat, stigma factor "mental health doesn't work," therapy prior to deployment, and poorer health were excluded from the final model.

•The competitive model predicting pharmacotherapy was a good fit for the data, $\chi^2(8, N = 424) = 3.99, p = .86$ (see Table 2). Post-deployment life stressors, combat experiences, therapy in Iraq, post-deployment social support, and poorer health were excluded from the final model. **psychotherapy and psychopharmacology as determined by two independent competitive logistic regressions (N = 424)**

Variable	B	SE B	Wald	OR
Psychotherapy				
Gender (female)	-1.07	0.45	5.69	0.34*
In-Theater Injury	0.68	0.29	5.62	1.98*
Need	0.42	0.13	10.72	1.52**
Psychotherapy In-Theater	0.79	0.34	5.29	2.21*
Positive attitudes about MH treatment	0.34	0.13	7.31	1.40*
Psychopharmacology				
In-Theater Injury	1.47	0.36	16.48	4.33**
Need	0.62	0.17	12.60	1.86**
Medication In-Theater	0.90	0.36	6.06	2.45*
Belief that MH Treatment Doesn't Work	-0.37	0.17	4.61	0.69*

*p < .05; **p < .01

Conclusions

Approximately one-third of the soldiers were receiving MH treatment. Treatment-seeking was more common among soldiers with MH problems, although over 50% of soldiers who screened positive for PTSD had not sought treatment. Rates of treatment-seeking in this panel were higher than in previous studies, suggesting that NG soldiers may be more likely to seek MH treatment. Surprisingly, stigma was not associated with MH treatment-seeking. Negative attitudes regarding MH treatment predicted lower levels of use. Campaigns that highlight the effectiveness of empirically supported therapies may increase utilization. In-theater injury also increase MH treatment seeking. This may be due to increased screening and referral once in the VA system. Thus, rates of MH service use may be increased by encouraging veterans to initiate any VA care (e.g. primary care).



Department of
Veterans Affairs

Recruitment and Retention of OIF Veterans in Longitudinal Research

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BACKGROUND

- Much of the extant literature on the development and maintenance of PTSD symptoms in military populations have largely relied on cross-sectional, retrospective data.
- In order to accurately identify psychosocial factors that predict post-deployment levels of mental health disruptions (PTSD, depression substance abuse), mental health service utilization, and military retention and attrition over time, longitudinal studies are needed.

- However, longitudinal data collection is reliant upon not only recruiting but retaining an adequate number of participants over time.

- Selective attrition from longitudinal studies threatens both the internal and external validity of research findings (Ribisl, Walton, Mowbray, Luke, Davidson, & Bootsmiller, 1996; Cotter, Burke, Loeber, & Mutchka, 2005).

Challenges in Tracking National Guard Sample and Possible Causes of Attrition

- Sample taken from large catchment area
- Large number of relatively young participants that are highly mobile
- Possible discharge from military service

- Given these challenges, it is critical to implement well-established strategies and procedures for successful follow-up and retention of our study cohort over the course of the longitudinal project.

- While attrition over time can be problematic, it is also imperative that researchers maximize response rates to mailed surveys at each data collection time point.

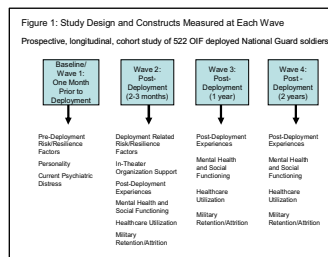
The Minneapolis Modified Dillman protocol

- Developed to maximize response rates during each wave of data collection. The protocol involves mailing an initial recruitment letter followed approximately 4 weeks later with a survey packet and incentive. At two-week intervals, non-respondents are mailed a post-card reminder, followed by a second survey (using postal mail), and third survey (using overnight Federal Express mail).

- While this protocol has provided good response rates in various populations, it is still uncertain what response rate it will produce in returning OIF veterans.

- Our current study provides us with a framework to address the question of recruitment and retention of returning OIF soldiers in a longitudinal survey-based study.

STUDY OVERVIEW



- Given that this project focuses on following up an existing cohort of NG soldiers who have already completed Time 1 baseline measures, maximizing subject retention is an important objective and therefore, the following outlined procedures were implemented to track participants as they reintegrated into civilian life.

Evidence-Based Longitudinal Retention and Subject Tracking Methods

Military Collaboration.

- The successful implementation of longitudinal research starts with building effective community partnerships (Leonard, Lester, Rothbaum-Borus, Mattes, Gwatz, & Ferris, 2003). Our research team has the strong support of the MN NG chain of command for this project and has maintained important collaborative research relationships with key military personnel who were instrumental in facilitating the initial recruitment of the study cohort.

- As we learned of the extension of the 1/34 BCT in Iraq, we consulted with our MN NG collaborators on the brigades redeployment schedule and appropriately revised our data collection timelines accordingly.

Building Affiliation through Project Identity.



- Successful longitudinal studies also utilize strategies that establish a project identity and build project affiliation among the study cohort (Leonard et al., 2003).

- Project Name: "Readiness and Resilience in National Guard Soldiers (RINGS) Study"

- Project Logo: See image to left.

- To obtain current address information after final mailing a 2008 magnetic calendar was sent. See below.

Systematic Subject Tracking Tool.

- A secure, cost-effective computerized subject tracking database was developed and used to facilitate follow-up with the cohort.

- All baseline/Wave 1 cohort participants provided detailed contact information as well as secondary contact information of two people close to them.

- The subject tracking database contains contact information linked with information about survey status for each participant. Research personnel carefully updated this database at each project encounter with study participants.

- The database was used to determine dates of future follow-up mailings and to calculate follow-up response rates.



Tracking Methods.

- Four main methods have been used to date in tracking participants.

- 1) "Return Service Requested" was printed on our mailing envelopes. This feature allows address correction by the post office.

- 2) Using VA administrative databases, our study personnel were able to access the address and phone number information provided by the participant at the time of enrollment.

- 3) As noted above, participants provided secondary contact information at the time of Baseline/Wave 1 pre-deployment data collection. In cases where we are unable to locate correct addresses, these people are contacted to learn the participant's new address and phone number.

- 4) Many participants also provided email addresses at the time they completed the Baseline/Wave 1 survey, and we have utilized this to send participants a brief message indicating that we do not have their updated address information and request this information if they wish to continue in the study.

- Using these methods we have successfully tracked the most recent addresses for 98% of our cohort.

Collection of Wave 2 Post-Deployment Data

Survey Procedures.

- Modified Dillman protocol (Dillman, 1978)

- Initial recruitment letter welcoming home participants mailed (postal address correction used)

- First survey mailing (20 page survey, \$50 incentive)

- Two week intervals, non-respondents mailed postcard reminder, followed by 2nd survey mailing (postal mail), and third survey mailing (overnight Federal Express mail)

- 2008 magnetic calendar mailing and telephone contact in order to recruit participants for clinical interviews

Wave 2 Response Rate

To date, we have achieved an 81% response rate (N = 423) to our Wave 2 mailed survey. Less than 2% of the initial Baseline/Wave 1 cohort (n = 9) have refused to participate and have asked to be removed from our mailing list. These 9 participants indicated their refusal to participate by sending back a blank survey or calling the project coordinator to opt out of the project.

Table 1. Response Rate after each Mailing Point

Response Rates	N	%	Cumulative %
(n = 423)			
Post 1 st survey	162	31.03%	31.03%
Post postcard	96	18.39%	49.42%
Post 2 nd survey	49	9.39%	58.81%
Post Fed-Ex mailing	68	13.03%	71.84%
Post new year tracking	48	9.20%	81.04%
Total	423		81%

SUMMARY

- Longitudinal data collection can be quite difficult with attrition of participants over time threatening validity of results

- Evidence based subject tracking methods should be implemented to minimize attrition and maximize project affiliation

- We believe our high response rate is in part due to our adherence to implementing the evidence-based tools described in detail above: good collaborative relationships, the building of project identity, and careful tracking methods

- Response rates based on modified Dillman protocol for mailed surveys has exceeded 80% in conjunction with utilizing good subject tracking methods

- Anecdotal evidence suggests that electronic mediums for corresponding with participants such as AKO email addresses and online surveys are future directions of longitudinal participant recruitment and retention within military samples.



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